SURVEY
OF
IRAQ FAUNA

Mammals, Birds, Reptiles, Etc.

Made by
Members of the
Mesopotamia Expeditionary Force
1915–1919

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March 8, 1943.

A SURVEY OF THE FAUNA OF IRAQ.

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MEMBERS OF THE MESOPOTAMIA EXPEDITIONARY FORCE "D" 1915-1919.

THE PAPERS ON THE ABOVE WERE FIRST PUBLISHED IN THE JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY DURING THE YEARS 1918-1923 AND ARE NOW REPRINTED AND PUBLISHED IN ONE VOLUME WITH THE AUTHORITY OF THE IRAQ GOVERNMENT.

AGENTS:

BOMBAY.

THE BOMBAY NATURAL HISTORY SOCIETY.

IRAQ.

THE TIMES PRINTING & PUBLISHING Co. (Mesopotamia), Ltd., Basra and Baghdad.

LONDON.

DULAU & Co., Ltd., Margaret Street, Cavendish Square, W.

PRINTED AT THE TIMES PRESS, BOMBAY.

Price Rs. 7-8.

PREFACE.

During the war large numbers of specimens of all kinds were sent to the Bombay Natural History Society from members and others serving in the Expeditionary Forces in Mesopotamia and Persia. As far as possible these were named in the museum and the donors advised, but in a large number of cases the identification was beyond the slender means at the disposal of the Society and many specimens had to remain unnamed. At the conclusion of hostilities all this material was sent to England, where along with that collected by Dr. P. A. Buxton and Mr. Edgar Evans, it was submitted to experts and the results published in the Society's journal.

It was suggested originally that a "Mesopotamian number" of the journal might be published, but this was found to be impracticable so it was decided to print extra copies of all the articles dealing with the collections and to bind them in book form. This volume, it was thought, many, who had served in Mesopotamia and Persia, might like to have and besides it would be useful to anyone stationed there. Sir Arnold Wilson, the then acting Civil Commissioner in Mesopotamia, cordially supported this idea.

The history of the gradual growth of the collections from Mesopotamia and Persia and how, in spite of privations and discomforts, members collected what specimens they could and sent them to the Society's museum is worthy of a paper in itself. We could tell of how Col. Magrath caught and skinned a Lesser Shrew—an animal not two inches long—in the trenches in front of Kut notwithstanding the flies and the Turkish shells, or of how Capt. Pitman, in charge of the Regimental Scouts, trained his men to look out for specimens as well as for the enemy, with the result that a steady stream of animals of all sorts were continually reaching the museum. In spite of his arduous duties Sir Percy Cox, in the early part of the war, found time to despatch a number of living specimens, including five giant herons, which lived for some-time in the Victoria Gardens, Bombay. Early in 1916 Capt. R. E. Cheesman began to send specimens to the museum, the beginning of the splendid Cox-Cheesman collections of birds and mammals, which he continued to do till he went home *via* Persia, collecting all the way. On his return to Mesopotamia with Sir Percy Cox in 1921 he began collecting again and this has resulted in a steady flow of birds and mammals to the British Museum where they are identified first by Mr. Oldfield Thomas and Dr. Ticehurst before being distributed. Through the liberality of Sir Percy Cox, a trained collector from our Society, LaPersonne, has been employed in lower Mesopotamia making collections, and during successive migration seasons he was sent to certain islands of the Persian Gulf for the purpose of collecting birds in their breeding haunts.

A story is told of Col. Wall, I.M.S., the Society's authority on snakes, of how, when he arrived at Basra, he covered the palm trees with posters advertising a reward for snakes brought or sent in to him. Alas before much could result he was transferred to a Cavalry brigade, and unfortunately soon afterwards was invalided to India, but not before he had managed to send a large box full of live tortoises to the museum, some of which were eventually sent to the London Zoological Gardens. We must not forget Dr. P. A. Buxton, though not at that time a member, a generous donor of specimens, and to whom the larger part of the invertebrate collections are due, as will be seen from the frequency with which his name is mentioned in the different papers. Then there was Capt. Ingoldby, R.A.M.C., who sent us specimens of all sorts, chiefly birds and reptiles from various localities between Baghdad and the Caspian, and Col. Peile, I.M.S., who made an interesting collection of butterflies in the plains and foot hills. Though not in Mesopotamia proper mention must be made of Col. F. M. Bailey, who collected many birds at Shusta, Persia, before he was transferred to

Central Asia to watch the Bolsheviks, and Mr. J. E. B. Hotson, I.C.S., O.B.E., who first sent us a collection of birds made by himself while on the Mekran Mission and who afterwards, at his own expense, employed one of the Society's taxidermists in Persian Baluchistan and later at Shiraz from which place he sent some new and many interesting specimens.

As complete a list as possible of all donors and collectors of specimens is given on another page and the Committee of the Society take this opportunity of thanking them for their assistance and help. If there are any omissions from the list they are inadvertent.

To all the authors of the different papers the Society is much indebted and more especially to Dr. P. A. Buxton, who not only contributed several valuable papers but also arranged for the working out and identification of most of the invertebrate groups. It is regretted that the papers on Coleoptera have not been ready in time to be included in this volume. We have however been able to include a paper by Mr. J. Omer-Cooper, F.L.S., on the Mesopotamian Terrestrial Isopoda.

Before closing this brief introduction I must refer to the first paper on the fauna of Mesopotamia which the Society published entitled "Notes on the mammals, birds and reptiles of Mesopotamia" compiled from such records as were available by Mr. N. B. Kinnear, M.B.O.U., at that time the Curator of the Society's museum and now an assistant in the Bird Gallery of the British Museum. This little brochure was designed for the use of the members of the Expeditionary Force and was found most useful. The difference between that brochure published in 1915 and the present volume is evidence of the work accomplished during years of war and travail, and the Society has reason to be proud of the conclusion of a work which owes its inception to two of its members, Mr. W. S. Millard, for many years Honorary Secretary of the Society, and Mr. N. B. Kinnear.

R. A. SPENCE,

July 1923. *Honorary Secretary,*

BOMBAY NATURAL HISTORY SOCIETY.

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Cardepia taylori. Rothschild. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 171, Dec. 1921.
Catamecia buxtoni. Rothschild. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 172, Dec. 1921.
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HYMENOPTERA.

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Halictus chaldœorum. Morice. Journ. Bom. Nat. Hist. Soc., Vol. XXVII, p. 826, 31st July 1921.
Halictus amaranus. Morice. Journ. Bom. Nat. Hist. Soc., Vol. XXVII, p. 827, 31st July 1921.
Nomada tigridis. Morice. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 193, 30th Dec. 1921.
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Polyphaga persica. Chopard. Journ. Bom. Nat. Hist. Soc., Vol. XXVII, p. 763, 31st July 1921.
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Conocephalus buxtoni. Chopard. Journ. Bom. Nat. Hist. Soc., Vol. XXVII, p. 765, 31st July 1921.
Pholidoptera persica. Chopard. Journ. Bom. Nat. Hist. Soc., Vol. XXVII, p. 766, 31st July 1921.
Paradrymadusa quazvinensis. Chopard. Journ. Bom. Nat. Hist. Soc., Vol. XXVII, p. 767, 31st July 1921.
Acheta amarensis. Chopard. Journ. Bom. Nat. Hist. Soc., Vol. XXVII, p. 769, 31st July 1921.

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Tarachodes arabicus. Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 720, 30th June 1922.

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Iris persa. Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 723.

Iris splendida. Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 723, 30th June 1922.

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Lerina buxtoni. Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 728, 30th June 1922.

Iranella eremiaphila. Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 730, 30th June 1922.

Tmethis hotsoni. Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 731, 30th June 1922.

Pœcilocerus arabicus, Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 731, 30th June 1922.

Tropidopola obstusa, Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 733, 30th June 1922.

Trigonocorypha angustata. Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 735, 30th June 1922.

Brachytrypes chopr[illegible]. Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 736, 30th Jun[illegible]

Æcheta chaldea Uvarov. Journ. Bom. Nat. Hist. Soc., Vol. XXVIII, p. 737, 30th June 1922.

ERRATA AND ADDENDA.

Note.—The spelling of place-names varies in different papers. This was unfortunately unavoidable but the correct spelling will be found in the maps which accompany the papers on mammals.

Page.	*Line.*	
49	13	for *supellia* read *supella.*
54	26	„ *Pholidoptera* „ *Paradrymadusa.*
54	27	„ „ „ „
55	25	„ canarian „ Canarian.
57	4	„ *Nobius* „ *Nemobius.*
57	13	„ descripted „ described.
58	20	„ *Cerisyi* „ macropterous.
58	24	„ ndividual „ individual.
59	13	delete *Supellina buxtoni* n. sp.
59	14	insert *Supellina buxtoni* n. sp. after Fig. 3.
59	30	for *Pholidoptera* read *Paradrymadusa.*
61	21	*for* St *read* L.
62	10	„ was described by me *read* is known to me also.
62	21	„ *Mlonkosiewitchi* read Mlokosiewitchi.
62	42	Specimens from Kazvin are not *S. cærulans* but *S. cærulans cærulipes.* Uv: those from Amara and Bagdad are *S. mecherial* Krauss: one of the specimens from Enzeli is *S. rubescens* (Walk.); from Bagdad is known also *S. vosseleri* Krauss (see my paper in Ent. Monthly Mag. (3), VIII, pp. 83—84, 1922.)
62	footnote *Line*	*for* "Entom. Monthly Magazine" 1921 *read* Journ Bom. Nat. Hist. Soc., XXVIII, p. 726.
63	15	„ six *read* sex.
63	15	„ creviter „ breviter.
63	16	„ impes— „ impres—
63	17	„ hand „ haud.
63	23	„ „ „ „
63	27	„ six „ sex.
63	29	„ sulsos „ sulco.
63	32	„ callossis „ callosis.
63	37	„ ponemeduim „ pone medium.
63	49	„ Femoras „ Iemora.
64	15	„ mea „ mea.
64	46	„ migar— „ migra.—
66	14	„ Ediburgensis „ Edinburgensis.
66	34	„ a „ as.
66	footnote	„ Uqber „ Ueber.
67	31	„ Prodronuss „ Prodromus.
67	31	„ *miniatat* „ *miniata.*
67	35	„ *Cobozoa rogenhaferi* read *Conoza rogenhoferi.*
68	6	„ *acridalla* „ *acridella.*
68	22	„ donieus „ danicus.
70	35	„ *Leplopternis* „ *Leptopternis.*
72	47	„ *Sanguinicollis* „ *sanguinicollis.*
73	one line from bottom *for* September *read* Lep.	
75	27	*for* coxac *read* coxæ.
76	34	„ *Assimilis* „ *assimilis.*
81	17	*Halictus chaldoeorum*: note Dr. Blüthgen tells me that he considers this to be conspecific with *M. micado* Straud.

Page.	*Line.*	
82	over block	*for* Sgnema *read* squama.
83	4	*Halictus kirvilleanus*: note this, according to Dr. Blüthgen, is a variety of *H. maculipes* Mor.
83	27	for *pulvercus* read *pulvereus.*
96	5	„ the frontier into cross *read* cross the frontier into.
96	16	„ *mesopotamia* read *mesopotamioe.*
96	21	„ *O read Œ.*
97	22-23	delete brackets round *Halcyon smyrnensis.*
97	at bottom	for *chrysoetus* read *chrysaetus.*
99	17	*for* below *read* blow.
100	37	*after* Enzeli *add* (Jan. to July).
102	28	for *Soemmeringii* read *soemmeringi.*
104	11	„ Zinnet *read* Linnet.
110	6	„ *campastris* „ *campestris.*
115	18	„ *Semitoquata* „ *semitorquata.*
119	12	*insert full stop after* winter.
125	46	*for* ralloides (Scop)—Squacco Heron *read* ibid Buff-backed Heron.
125	47	„ squacco *read* Buff-backed.
125	49	„ „ „ „
131	10	„ *korejeur* „ *korejewi.*
132	38	„ paläerktischen „ paläarktischen.
134	2	„ *Dermaptera* read Dermaptera.
134	13	„ *ribaria* „ *riparia.*
134	27	„ elytræ in „ elytræ. In.
135	48	„ *visuaga* „ *visnaga.*
136	29	„ bath white „ Bath White.
136	41	*after* in the *add* true.
136	44	„ "Jersey tiger" *add* moth.
136	46	*for* small cabbage *read* Small Cabbage.
136	47	„ white „ White.
136	47	„ bath white „ Bath White.
136	47	„ clouded yellow (*crocea* „ Clouded Yellow Croceus.
136	last line	„ brown argus „ Brown Argus.
137	1	„ *ticarus* and *flava* (*thaumus*; and..... painted lady *read icarus* and.....Painted Lady.
137	2	„ long *read* Long.
137	3	„ *Euchloe* „ *Euchlœ.*
137	14	after *hanifa add* Nordm.
137	15	„ *magna* „ Stdgr.
137	between lines 16 and 17	*insert* NYMPHALIDAE.
137	21	after *trivia* insert Schiff.
137	23	*for* Stagr *read* Stdgr.
137	34	after *charlonia* insert Bonz.
138	5	for *Thymelycus* (Adopae) *read Thymelicus* (*Adopoea*).
138	11	after *larissa* insert Hb.
138	19	„ *telmessia* „ Z.
138	25	„ *didyma* „ Ocho.
138	26	for "*C*" *album* L. read *c-album* L. f. *hutchinsonii* Robson.
138	27	„ *J. album* „ *j-album.*
138	40	„ *kurdistana* read *kurdistanica.*
138	43	„ *marginallis* „ *marginalis.*
138	47	„ Gerhard f. *gerhardti* „ Gehrard f. *gehrardi.*
138	51	„ Bov *read* Bdv.
138	52	„ *boeticus*, Rambur *read* Esp. subsp. *orientalis* Reverdin.

Page.	*Line.*	
139	3	*insert* comma between 1 and 28 c.
139	10	after Khanikin *add* Bagdad.
139	between lines 14 and 15 *insert* Satyridae.	
139	16	*after* Seitz *add* 1, 39 b.
139	46	*for Taliche* read Taliche.
139	47	,, ,, ,, ,,
140	Above line 1 *insert* Genus CŒNONYMPHA.	
140	23	*for* 1.43 c *read* 1, 43 c.
140	41	,, Hb., Seitz 1.42 e, *read* Hb., f. hanifa, Nordm 1, 42c.
140	42	,, tetephassa *read telephassa.*
141	14	,, I when without a net *read* when without a net I.
141	28	,, Sham *read* Shan.
141	41	., 1.43 f. ,, 1, 43 f.
142	14	*after* white *delete* ,,
142	18	*for* It is the B. M. forms from *read* It is in the B. M. from.
142	35	,, famale *read* female.
142	37	*delete* 51 specimens.
143	15	after *S. hermione* insert L.
143	between lines 15 and 16 *insert* Ann. Mag. N. H. (9) VIII, p. 592.	
144	8	for *lupinus, centralis* read *lupinus costa*, subsp. *centralis.*
144	between lines 8 and 9 insert Ann. Mag. N. H. (9) VIII, p. 593.	
144	43	*for* Tekka *read* Tekke.
144	47	,, Samarkhand *read* Samarkand.
145	18	*after jurlina insert* L.
145	23	for *telmessia kurdistana* read *telmessia*, Z ssp. *kurdistana.*
145	30	,, *telmessia palescens*, read *telmessia* Z. ssp. *palescens.*
145	34	,, *areas* read *oreas.*
146	23	,, 1.71c ,, 1, 71 c.
146	40	*after* gardens *insert* comma.
147	5	*for* Sehiff *read* Schiff.
147	18	,, excessive heat *read* excessive heat and.
147	30	,, *Persea* read *persea.*
147	31	,, of India on *read* of India. On.
147	39	,, tail and *read* tail end.
147	41	,, end ,, and
147	2	,, from bottom for Sp. *read* species.
147	last line *for* Butt. *read* Butl.	
148	4	*delete* N. W. Persia L.....1918.
148	7	*after* April *add* see Plate fig. 11. 12 ♂ ♀.
148	9	,, 1918 ,, see Plate fig. 7 ♀.
148	13	,, *didyma, add* Schs. subsp.
148	14	in front of 12th August *insert* Karind gorge.
148	15	*delete* continues.
148	15	*from* "Taking.....*didyma*" (line 20) *transpose* to
148	15	*follow para ending* "bases of the wings" (line 45).
148	22	*for* full stop after 1850 *read* colon.
148	22	*from* "A character.....proximal one" (line 26 *transpose to follow para* "Taking .....didyma below."
148	27	delete whole line.
148	30	*before* hindwings *insert* underside.
148	42	*for* is *casta* in *read* in *casta* is.
148	46 & 47	delete.
149	8	for *cardni* read *cardui.*

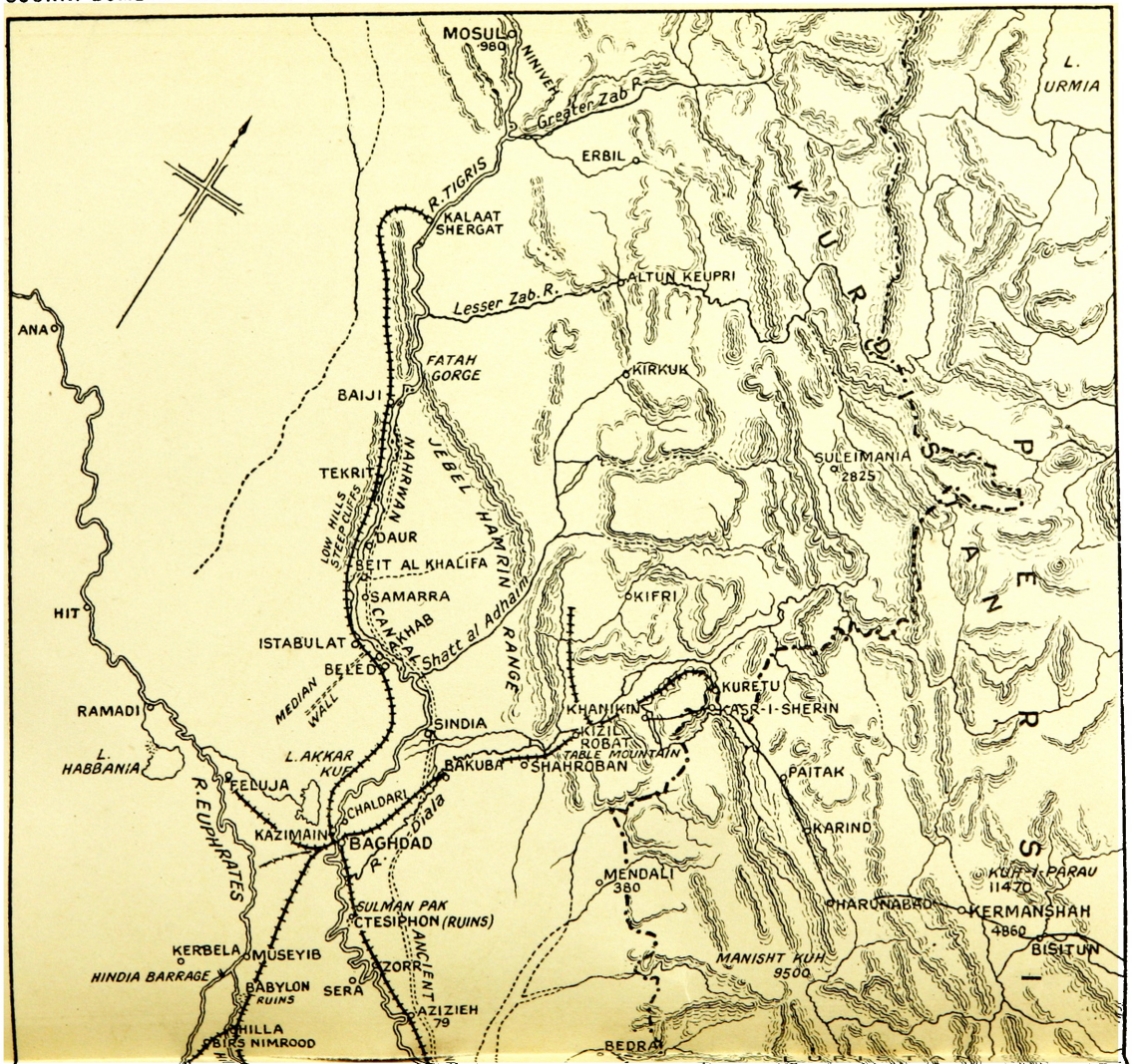
Page.	*Line.*	
149	9	*for* L spaped *read* L-shaped.
149	12	„ PERAMEIS *read* PYRAMEIS.
149	25	„ Hamarin *read* Hawiian.
149	45	„ white *read* with.
150	15	„ *C. album* read *c-album.*
150	16	„ Turkis—*read* Turkes—
150	25	„ *C. album* read *c-album.*
150	28	„ „ „ „
150	32	„ Tan *read* Tau.
150	at foot	*substitute for present line* Staudinger Stett. Ent. Zel. 1881, p. 286 :—*and transpose line to beginning of para starting* Vanessa (Grapta) . . . .
151	1	*for* it *read* interposita.
151	7	„ *C-album* read *c-album.*
151	11	„ „ „ „
151	19	„ the older name *read* an older name than *lunigera.*
151	20	„ *hamigera* read *lunigera.*
151	23	„ *C-album.....hutchinsonni* read *c-album hutchinsonii.*
151	44	„ *machaon* read *Machaon.*
154	25	„ „ „ „
154	29	„ *didyma* „ *persea.*
154	29	„ *Synchlœ* „ *Synchloë.*
154	30	„ „ „ „
154	30	„ *Euchlœ* „ *Euchloë.*
155	1	„ 1.7c „ 1, 7c.
155	8	„ explain „ explains.
155	11	„ 1.7a „ 1, 7a.
164	3	„ Shdgr „ Stdgr.
165	1	„ *Zenobiinae* „ *Zenobiidae.*
165	47	„ *Westermanniinœ* „ *Westermaniinœ.*
165	47	„ *Acoutnoeii* „ *Acontiicæ.*
166	36	„ *Plusiinœ read Plusiinœ.*
167	20	*after* sp. nov. *add* Type in Brit. Mus.
169	25	*for microshictella* read *microstictella.*
178	2	„ typica *read* typical.
178	39	„ *Macrolepidoptera* of the world read *Macrolepidoptera* of the World.
179	6	„ *Lymantriidaeri d* (Lœ) ip *read Lymantriidœ* (*Liparidœ*).
180	20	*delete* No. 1....Novitates.
183	1	for *Geometrine* read *Geometrinœ.*
183	28	„ Standingir *read* Staudinger.
192	under fig. 8	transpose 96. *Apis mellifera,* L., to line 19 in front of, Several specimens.
243	43	for *crocea* read *croceus.*
244	27	*delete* of these.
244	39	*for* the *read* be.
245	1	„ Dab „ Fab.
245	3	„ 50 ♂ *read* 50 ♀
245	49	„ N. Persia „ N. W. Persia.
246	16	„ and Chitral *read* Chitral and N. E. Asia.
246	17	„ EUCHLŒ *read* EUCHLOË.
246	27	„ *ă* read *á*
246	29	„ nc „ ne.

Page.	*Line.*	
246	33	*after* and 32 *insert* Rhop. Pal.,
246	37	*for* in the both *read* in both the.
246	39	,, Verity restricted *read* Verity, be restricted.
246	48	,, asepal *read* a sepal.
247	27	,, beak line *read* beak-like.
247	44	,, all *ausonia* read all. *Ausonia.*
247	46	,, *ausonia read Ausonia.*
247	49	,, ausonia like belemia was *read* Like belemia it was.
248	39	,, Rober *read* Röber.
250	3	*after charlonia insert* Douz. ssp.
250	18	*for* Konh *read* Kouk.
251	5	*after* Russia *insert* (Crimea and Odessa).
251	21	*for* but....Caucasus *read* probably racial in Uralak.
251	42	*delete* subsp..... ♀
252	6	*for* figured *read* recorded.
252	7	*after* belong *insert* Alpheraky gives a coloured figure of a specimen from S. Persia, lent him by Ovinoff in Oberthurs Etudes, Vol. VII.
252	47 & 48	transpose to line 42, page 241.
252	48	*for* fig. 12 *read* Figs 1. 2.
253	8	,, 1908 *read* 1903.
253	21	*insert* inverted comma after *dyala.*
253	26	*delete* inverted commas at end of line.
254	6	*for* in W. Persia *read* in N. W. Persia.
255	23	,, m *read* in.
255	32	,, North *read* N. W.
255	53	,, N. Persia *read* N. W. Persia.
256	last line	,, n.w. *read* h.w.
257	2	,, brown *read* Brown.
257	41	,, Riley .... H. *read* Riley Ann. & Mag. N. H.
257	42	,, Fig. 89 *read* Figs. 8 and 9.
257	52	,, 1 ♂ ,, 1 ♀
257	53	,, rom Dek Tehechma *read* from Deh Tcheshma.
259	18	,, Esq *read* Esp.
259	26	*after* HEODES *insert* Dalman.
259	45	,, them ,, for the present.
260	5	*for* Ril *read* Riley.
260	22	,, itz.....4 *read* Seitz Vol. I, 83 g.
260	last line	,, *galba* is *read Galba* is.
261	7	*delete* I.....correct.
261	10	*for* B. Blewitt-Taylor *read* R. Blewitt Taylor.
263	51	*delete* comma *after* A.
264	11	*for* stud *read* stand.
264	18	*delete* inverted commas.
264	20	*insert* inverted commas at end of line.
265	4	*for* f. gerhard *read* f. GERARDI.
265	5	,, fig. 34 *read* figs. 3 and 4.
265	5	*after* 4 *add* (The male, 4, figured is from Mardin, Armenia and now in B. M. ex Standinger.)
265	12	*add* inverted commas at end of line.
265	14	*delete* inverted commas.
265	19	*after* fig. *insert* 20.
266	30	*for* C.....85 a *read, C. altheae* Esp. ssp. *orientalis* Reverdin Bul. Soc. Lep. Geneva. p. 225. 1913.

Page.	*Line.*	
275	40	Further research has elicited that the Babylonian Reed Warbler was described in 1891 by Hartlaub from a single specimen obtained at Ngurri, Tanganyika Territory, E. Africa by Emin Pasha (abh. Nat. Ver. Bremen XII, p. 7) where apparently it winters. Bull. B. O. C. Vol. XLIII, p. 46, 1922.
286	23	*for* Aenanthe *read* Œnanthe (The same correction to be made at the heading of paras. 106-116.)
312	25	,, Naumann *read* Newmann.
345	8	,, Recurvirostris avocetta *read* Recurvirostra avosetta.
345	9	,, ,, ,, ,, ,, ,,
356	5	,, coxoe *read* coxal.
356	11	,, ,, ,, ,,
356	14	,, Morphaeris *read* Morphacris.
363	53	*for* Pœclilocerus read Pœcilocerus.
365	4	,, 2 *read* 1 B.
365	19	,, (fig. 1) *read* (fig. 1 A).
365	25	,, (fig. 2) ,, (fig. 2 B).
366	7	,, *Thisoecelrus* read *Thisoecetrus.*
366	20	,, 3c, 4 c. *read* 2A.
366	54	,, *Clylindrica* read *cylendrica.*

LIST OF COLLECTORS.

Aldworth, Capt. T. P., D.S.O.
Armstrong, Capt. J., R.A.M.C.
Arthur, Major E.
Bagnall, Major R.
Bailey, Lt.-Col. F. M., C.I.E.
Bailward, Col. A. C.
Bignell, Capt. R.
Blandy, Capt. R.
Boulenger, Capt. C. L.
Brewitt-Taylor, Major R., R.A.M.C.
Brolemann, H. W.
Brooking, Major-Genl. Sir F.
Broughton, Major T. D., R.E.
Burgess, Capt.
Buxton, Capt. P. A., M.B.O.U.
Cheesman, Major R.E.
Christy, Major C.
Chrystal, Major J.
Collins, F.
Connor, Lt.-Col. F. P., D.S.O., I.M.S.
Cox, Major-Genl. Sir P. Z., G.C.I.E., K.C.S.I.
Culbertson, J. M. S.
Dickson, Lt.-Col. F. P.
Egerton, Lt.-Genl. Sir R., K.C.B.
Evans, Lt.-Col. W. E.
Fitzgerald, Major.
Fleming, Major A. M., D.S.O.
Fraser, Major F. C.
Garrett, Lt. J. T.
Gibson, Lt.-Col. H. R. B., I.M.S.
Graham, Capt. W., R.A.M.C.
Harrison, Capt. L.
Hearn, Capt. E. S.
Hedgecock, Capt.
Hingston, Capt. R. W. G., I.M.S.
Hobkirk, Capt. R.
Hotson, J.E.B., I. C. S., O.B.E.
Herdon, Lt. B. L.
Hyatt, Lt. W.
Ingoldby, Capt C. M., R.A.M.C.
Jenkins, J.
Kilminster.
Keary, Major-Genl. H. D.
Lake, Major A. E. W.
Lane, Lt.-Col. W. H.
Livesey, Capt. T. R.
Logan-Home, Capt. W. M.
Ludlow, Capt. F., M.B.O.U.
Mackenzie, Capt. H. L., I.M.S.
Macdonald, Lt. A. St. G.
Mackey, Brig.-Genl. H. J. A., C.M.G., M.V.O., D.S.O.
May, H. J.
Magrath, Lt.-Col. H. A. F.
Morice, F. D., M.A., F.Z.S.
Napier, Capt., I.M.S.
Paschen, Peter.
Peile, Lt.- Col. H. D., I.M.S.
Perreau, The late Major G. A.
Philby, H. St. J., I.C.S., C.I.E.
Pitman, Capt. C.R.S.
Robinson, Capt. G.D.
Ross, Major E. J.
Scott, Major G. B.
Shakespeare, The late Capt. W. H.
Shortridge, Capt. G. C.
Shortt, Capt. W. H. O.
Short, Capt. H. E.
Stevens. Lt.-Col.
Stoneham, Capt. H. F., O.B.E.
Ticehurst, Capt. C. B., M.B.O.U., R.A.M.C.
Venning, Major F. E. W.
Wall, Lt.-Col. F., C.M.G., I.M.S., C.M.Z.S.
Watney, Lt.-Col. C. H.
Watts, Major.
Webster, Lt. D. R. N.
Wernicke, Major.
Whitehead, H., R.A.M.C.
Wilson, Lt.-Col. Sir A. T., K.C.I.E., C.S.I., C.M.G., D.S.O.
Wimshurst, Major.
Wood, Lt.-Col. H. S., I.M.S.
Wouterz, E. W. E.


MOSUL
980
NINIVEH
Greater Zab R.
L.
URMIA
ERBIL
R. TIGRIS
KALAAT
SHERGAT
ALTUN KEUPRI
Lesser Zab. R.
KURDISTAN
PERSIAN
ANA
FATAH
GORGE
KIRKUK
BAIJI
NAHRWAN
JEBEL HAMRIN RANGE
SULEIMANIA
2825
TEKRIT
LOW HILLS
STEEP CLIFFS
DAUR
BEIT AL KHALIFA
SAMARRA
KIFRI
HIT
ISTABULAT
CANAL
AKHAB
Shatt al Adhaim
BELED
MEDIAN
WALL
KURETU
KASR-I-SHERIN
RAMADI
SINDIA
KHANIKIN
KIZIL
ROBAT
TABLE MOUNTAIN
L.
HABBANIA
L. AKKAR
KUF
BAKUBA
SHAHROBAN
PAITAK
FELUJA
CHALDARI
Diala
R.
KARIND
R. EUPHRATES
KAZIMAIN
BAGHDAD
MENDALI
380
KUH-I-PARAU
11470
SULMAN PAK
CTESIPHON (RUINS)
PHARUNABAD
KERMANSHAH
4860
KERBELA
MUSEYIB
BISITUN
HINDIA BARRAGE
MANISHT KUH
9500
ANCIENT
BABYLON
RUINS
SERA
AZIZIEH
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HILLA
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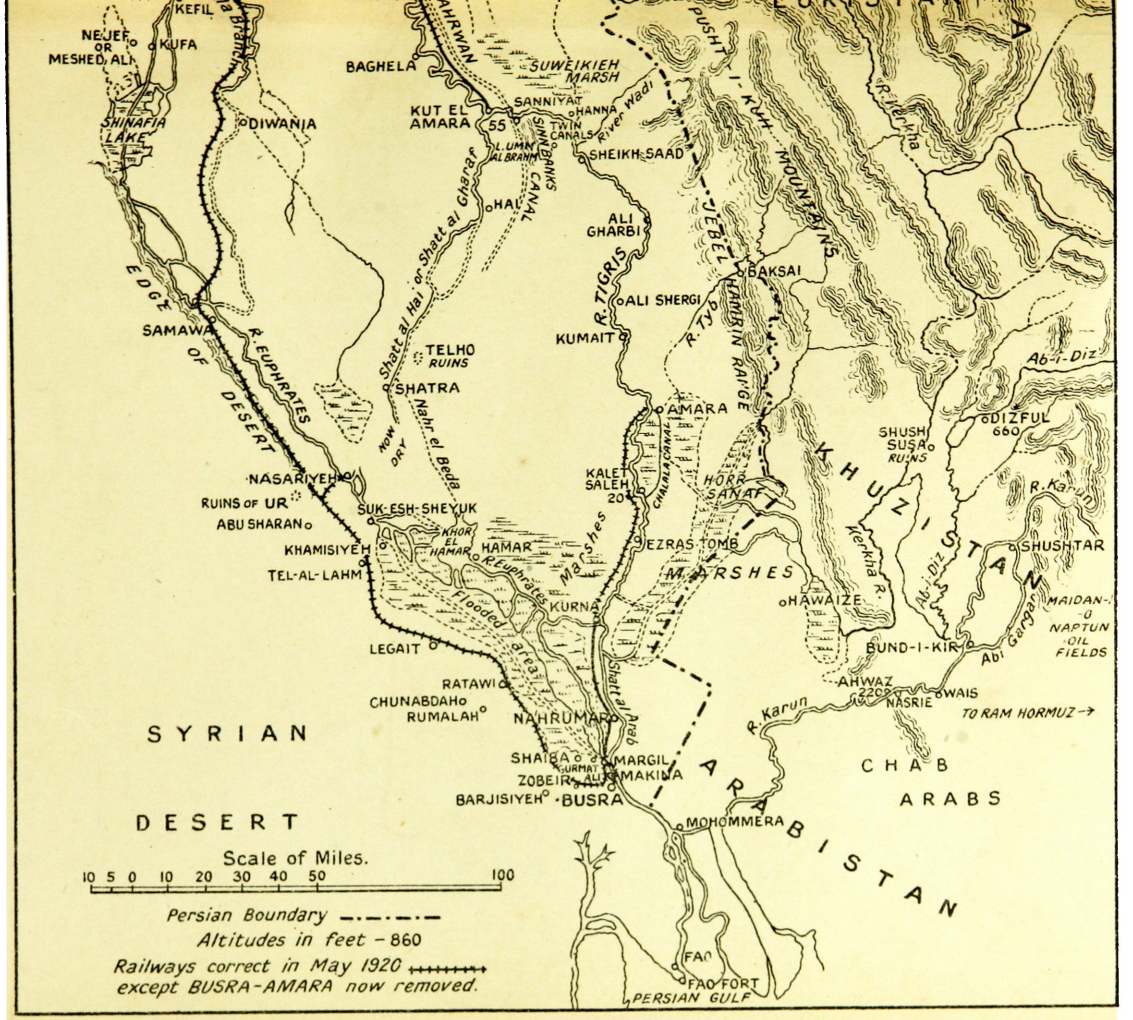
BEDRA



MAP OF MESOPOTAMIA and Surrounding Country to illustrate reports on Zoological Collections made by Members of **THE MESOPOTAMIAN EXPEDITIONARY FORCE.**

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 20, 1920.]

REPORT ON THE MAMMALS OF MESOPOTAMIA

COLLECTED BY MEMBERS OF THE MESOPOTAMIAN EXPEDITIONARY FORCE, 1915 TO 1919.

BY

MAJOR R. E. CHEESMAN, M.B.O.U., F.R.G.S.

Mr. Oldfield Thomas conferred a privilege when he invited me to write this paper. Both he and Mr. R. C. Wroughton have combined in making the task a light and pleasant one. It has been necessary for me to ply them with a continual hail of questions throughout and to their patient guidance must be attributed any merit the paper may possess. To the rest of the staff in the mammal room of the British Museum Natural History I also acknowledge a debt of gratitude for valuable assistance.

The collection comprises 259 specimens of 36 different species and sub-species. Nine have already proved new to science. Several more are awaiting further material, and are only provisionally placed under the name of their nearest ally.

It may be said, that 'awaiting further material' often recurs in the notes. A lot of confusion is caused by the hasty naming of species and sub-species, on slight differences of colour or proportions, which afterwards prove to be mere individual variation and are not constant. It seems preferable to err on the side of caution.

The collection consists entirely of mammals contributed by members of the Mesopotamian Expeditionary Force. It has therefore an historic interest as well as a scientific value.

Many of the specimens were collected very close to the enemy's lines and some must have been skinned within range of his guns. The acquisition of such a good series under the difficulties attending service conditions is largely due to the encouragement given to all Officers interested in birds, beasts and fishes, by the officials of the Bombay Natural History Society, who in spite of the many calls on their time during the War, always managed to acknowledge and identify the specimens sent.

Again a factor that played no small part, is the able pamphlet, "Notes on the Animals of Mesopotamia", written by Capt. N. B. Kinnear in 1916 and circulated at an opportune moment.

To all interested in Natural History, that is the large majority of Officers and men in Mesopotamia, this has been a treasured book of reference. To those who were collecting it has proved invaluable. I have taken it throughout the writing of this paper as the framework to which the present notes on the specimens obtained must be considered as a supplement.

To Major-Gen. Sir P. Z. Cox, and Lieut.-Col. A. T. Wilson, I was personally indebted while on service for much timely assistance, for the loan of a gun and for facilities of transport of specimens down river and on to India. Without this many of my skins would either never have been collected or have been spoilt or even lost *en route*.

All my specimens have been united under the name of the Cox-Cheesman collection. For the help given me by all my senior officers in Mesopotamia I would like to express my appreciation. They have always been ready to smooth the way for collecting when possible and to read "King's Regulations" in their widest interpretation to that end.

Capt. P. A. Buxton has kindly allowed me to make use of his collection which was sent direct to the British Museum for inclusion in this paper.

The Indian Museum sent a few specimens to the British Museum for identification. These have also been added.

A list of the officers who collected and sent specimens to the Bombay Natural History Society is given below.

Care has been taken to avoid errors, but in the event of omissions or mistakes in the spelling of names it is hoped that they will be excused, as the writing on labels is often difficult to read and is sometimes obliterated.

Major E. Arthur.
Major R. Bagnall.
Lieut.-Col. F. M. Bailey, C.I.E.
Major R. E. Cheesman.
Major C. Christy.
F. Collins, Esq.
Lt.-Col. F. P. Connor, D.S.O., I.M.S.
Maj-Gen. SirP.Z. Cox, G.C.I.E.,K.C.S.I.
J. M. S. Culbertson, Esq.
Deputy Civil Commissioner.
Lt.-Col. Evans.
Major F. C. Fraser, I.M.S.
Capt. Graham, R.A.M.C.
Capt. R. W. G. Hingston, I.M.S.
Capt. C. M. Ingoldby, R.A.M.C.
J. Jenkins, Esq.
Kilminster, Esq.
Capt. T. R. Livesey.
Capt. F. Ludlow.
Capt. H. L. Mackenzie, I.M.S.
Brig.-Gen. H. J. A. Mackey, C.M.G., M.V.O., D.S.O.
Lieut.-Col. H. A. F. Magrath.
H. J. May, Esq.
Capt. Napier, I.M.S.
Patiala Lancers. A squadron.
Capt. C. R. S. Pitman, D.S.O., M.C.
The late Major G. A. Perreau.
Major G. B. Scott.
Capt. G. C. Shortridge.
The late Capt. W. H. Shakespeare.
Capt. W. H. O. Short.
Lt.-Col. F. Wall, C.M.G., I.M.S.
Lt. D. Webster, R.N.
H. Whitehead, Esq.
Lt.-Col. Sir A. T. Wilson, C.S.I., C.M.G., C.I.E., D.S.O.

Although many men are now conversant with the topography of the area covered by this paper, a short sketch will not be out of place, for those who are not. Mesopotamia, for which the Turkish name of Iraq is preferable, is a large flat alluvial plain of comparatively recent origin. It is 450 miles in length and about 150 miles in breadth. The foothills of the Kurdistan and Persian Mountains form a Northern and North-Eastern boundary, while to the South and West lies the margin of the Arabian and Syrian desert.

The land of the lower reaches of the Karun River, although in Persia has been included in this paper, as fantistically it is in the great Mesopotamian plain.

Through the plain the three main rivers—Tigris, Euphrates and Karun—wind a serpentine course towards the sea at Fao on the Persian Gulf. The Tigris and Euphrates unite at Kurna and also at Gurmat Ali to form the Shatt-al-Arab, a river of considerable width. This is in turn joined by the Karun at Mohommerah. All three rivers bring down a large amount of silt, and it is of this the Mesopotamian soil is composed, without any admixture of stones or gravel. The Karun enters the Iraq plain at Ahwaz where it crosses a low spur of the Jebel Hamrin range of hills, in a series of rock-strewn rapids. The Tigris crosses the same range several hundred miles to the North-West through the beautiful Fatah Gorge. It however does not finally leave the land of rocks behind until Samarra is passed, where there are cliffs of conglomerate. This region of undulating hills and rocky ranges extends from Samarra north-west to Mosul as well as along the North and North-East boundary previously mentioned. So far very little collecting has been undertaken there. It is the home of the porcupine and the gazelle grazes on the higher plateau. The latter is also well

distributed along the Mesopotamian plains to the sea. In the immediate neighbourhood of Mosul I have seen the mounds and tunnels of a species of mole or rodent mole which does not occur lower down.

The capture of a 'badger' with young was reported at the Ali Gherbi Military Grass Farm during a flood. From the description there seems little doubt it was the new species of ratel, which has been obtained by Col. A. T. Wilson in the foothills near the Tyb river less than 30 miles distant and is mentioned by Kinnear.

Of real forest land there is none, although the broad belt of date palms that fringe the banks of the Shatt-al-Arab gives that impression from the river, until glimpses of the desert appear a mile or so in the background. These plantations are the haunt of the jackal and the Persian mungoose.

I am inclined to treat the stories of ancient Mesopotamian forests as a myth. If the Kings of Egypt came there to hunt elephants it is probable they also hunted their owners who had imported them. The building of the huge canals at least four thousand years ago points to the land being desert then and not a region capable of sustaining natural forest. Two vast permanent reed covered marshes have been formed above Karna by the overflow of the Tigris, Euphrates and Kerkha, a Persian river. These are the Hammar Lake and Hawaiza marsh. These and smaller marsh districts have so far produced no mammal peculiar to those areas unless we may include the otter. Judging by the number of these skins exposed for sale in the bazaars, they must be plentiful.

Patches of thick jungle occur locally in the large U bends of the rivers and grow a tangle of dwarf tamarisk and Euphrates popular. They seldom exceed a mile or two in width, but harbour small herds of wild pig. It is unfortunate that no skins or skulls have been sent so we do not yet know the species. We can be sure however that the boars seen are too large to be the Indian pig and I am of opinion that the hair is too brown for the typical European wild boar and lack the hoary grey tinge of the bristles of this species several of which I have examined recently in the London Zoological Gardens. It is also certain from the many mascots seen about the Mesopotamian camps that the young are striped.

Low cover is afforded by scrub growing in the vicinity of banks of rivers and canals. This chiefly consists of a dwarf acacia, *Prosopis stephania*, the "Shok" of the Arabs and the wild liquorice plant, *Glycyrrhiza glabra*; also *Lycium europaeum*, a thorny plant with bright red berries, and *Sueda monoica*, of which the lower leaves are succulent and which appears to thrive also on the salt lands, where no other plants can live.

Here are the wild cat, hares, jackal, mole rats, several of the gerbils (*Tatera*, *Dipodillus* and *Meriones*) and the hedge hogs. The foxes are found in the bare desert country behind, seeming to prefer it to the cover.

The country on the right bank of the Euphrates has distinct features. It is the only real desert region and is in fact the edge of the Syrian desert. Gravel is found as far down as Shaiba within a few miles of the sea. The hyæna, and Loftus' jerboa were obtained in this and no other locality, add to this a very pale fox, jackal and hare and a new hedge-hog and gerbil and we have evidence that this portion of the country contains a fauna of exceptional interest:—

Although the contributors to this collection are to be congratulated on the results, it must not be considered that the work is finished. It has just begun. The satisfaction of the thirst of science can be but temporary. A few notes of the particulars required are given for the assistance of those who find themselves in a position to continue the collection.

The following measurements, if possible in millimeters, should be taken before skinning and recorded on the label :—

1. H. & B. Head and body, that is from the tip of nose to the joint of tail and spine.
2. TL. Tail without end hairs.
3. HF. Hind foot without claws, *i.e.*, from the tip of the longest toe to the hinder side of the heel.
4. Ear. Ear from notch at base to tip. This would be the longest inside measurement of the ear.

In addition it is important to record on the label the date, sex, locality, altitude above sea and your name.

The locality of small villages should be identified with towns or districts well known or marked on maps.

Other field notes such as nature of the soil, food, immature, etc., are also of great assistance when working out a collection.

Have the skin removed as carefully as possible. Correctly made up skins are stuffed and dried, leaving the animal in a squatting position—the front legs pointing forwards, and the hind legs backwards—the bone is pulled out of the tail and a straight wire with wool wound round it takes its place but a roughly made skin is better than no skin at all.

The skull of small mammals at least should be dried with the meat on and sent separately. The bones and teeth travel better when treated thus. Both skin and skull should be labelled with the same number to ensure subsequent identification. The value of a series of skins and skulls of the same species cannot be over-estimated. Accurate identification or separation of closely allied forms, is only made possible by the comparison of a large number of specimens.

Do not hesitate to send everything you can get. It is often the apparently common place which proves to be an important link in the chain.

1. Rhinolophus hipposideros midas, K. And.

1905. *Rhinolophus midas*, K. Andersen, P. Z. S. ii, p. 138.

1918. *Rhinolophus hipposideros midas*, K. Andersen, A. M. N. H. 9, ii. p. 378.

Midas Horse Shoe Bat. Arabic "Kushaf-el-leyl" or "Sahat".

N.B.—These names apply to all bats in Arabic.

2 ♂	1 ♀	Baghdad.	Buxton 23-9-17 to 11-10-17.
1 ♂	1	„	Ingoldby, Nov. 1917.

A small bat with long pale grey fur, with purplish tinge towards the end of the hairs. The ears are large with curved and pointed tips.

Buxton remarks from Baghdad—Apparently common.

The distribution given is Gilgit to Cyprus. Andersen.

The type locality is Jask, Persian Gulf.

2. Asellia tridens, E. Geoff.

1812. *Rhinolophus tridens*, E. Geoffroy, Desc. Egypt. ii., p. 130.

Trident Leaf-nosed Bat.

1. Feluja, Euphrates. Mackenzie. No. date. in al.
2. Lake Akkar Kuf. Baghdad. Pitman, 24-3-17 and 16-8-17 „

This bat is slightly larger than the last, though the description of the fur would be much the same. The very large ears are its chief distinction in the field.

This was compared with the series of *A. tridens* from Egypt and appears inseparable.

Andersen and De Winton give the distribution as Senegal, Algeria, Tunisia, S. Syria and Zanzibar, with a sub-species *A. tridens murraiana* from Karachi and Bushire.

3. Pipistrellus kuhli, Kuhl.

1819. *Vespertilio kuhlii*, Kuhl. Ann. Wett. Ges. Nat. IV., p. 199.
White bordered Pipistrel Bat.

1 ♂ 16 ♀ 1	Amara	Buxton	29-1-18—7-6-18.
2 ♂	Baghdad	,,	8-10-17.
1	Shushter, S. Persia	Bailey.	21-1-18, alt. 500 ft.
2	Busra	Cox-Cheesman	June, 1916.
2	Sheikh Saad	Ingoldby	20-7-16 & 21-7-16.
2	Busra	Christy	June, 1918, in al.

The commonest bat of the lower Tigris.

Although several almost black forms appear in the series, this is usually a small dark brown bat, with short hair and ears and a pale border to the wing filament. Buxton remarks, plentiful in Amara and the only bat that appears in winter on warm nights, and all females were pregnant in March.

Ingoldby saw them chasing insects round the lights of river steamers near Sheikhs Saad, and I found it in numbers in the Busra houses.

Miller gives the distribution as Mediterranean region eastward into Asia. It has been recorded by the B. N. H. S. Mammal Survey from Sind.

4. Pipistrellus coxi, Thos.

1919. *Pipistrellus coxi*, Thomas, J. B. N. H. S., Vol. XXVI, No. 3, p. 747.
Cox's Pipistrel Bat.

1. Type. Beit Mahommad. Amara,	Cox-Cheesman.	20-3-18.
1. Makina, Busra.	Christy	20-3-18.

A small bat with light grey back, white belly and black ears and muzzle. The type was caught in the house of Sheikh Mahommad, in the vicinity of marshes on the Chahala canal. The Makina specimen in the Mess of No. 33 B. G. Hospital.

It has been named by Mr. Oldfield Thomas after Major-Gen. Sir P. Z. Cox.

5. Eptesicus, Species.

Serotine Bat, spec.

1. Amara.		Cox-Cheesman, 16-3-18.

A single specimen of a bat was collected in Amara, much resembling *P. kuhlii* in size, but the forearm is longer, colour paler and white border is missing. In the absence of the skull definite determination is not possible until more specimens are forthcoming. It is probably nearly allied to *Eptesicus matschiei pellueens*—several of which were obtained by Woosnam in Ahwaz.

6. Eptesicus hingstoni, Thos.

1919. *Eptesicus hingstoni*, Thomas. J. B. N. H. S., Vol. XXVI, No. 3, p. 745.
Hingston's Serotine Bat.

1. Type.	Baghdad.	Hingston,	1-5-17.
1.	Busra.	Cox-Cheesman,	6-8-18.
1. Khazimain,	Baghdad.	,, ,,	8-11-18.
1 ♂.	Busra.	Wall.,	15-1-17. M. 16 in al.

Of the two Busra specimens only the skulls have been examined.

A bat about twice the size of *P. kuhlii*, fur on the back, mouse coloured, underparts paler, ears brown. It has been named by Mr. Oldfield Thomas after Capt. R. W. G. Hingston.

7. Eptesicus walli, Thos.

1919. *Eptesicus walli.*, Thomas, J. B. N. H. S., Vol. XXVI, No. 3, p. 746.
Wall's Serotine Bat.

1 ♀. Type. Busra. Wall, 27-5-16.

The type of this species has a smaller forearm than that of *E. hingstoni*. This bat has been named by Mr. Oldfield Thomas after Lt.-Col. F. Wall.

8. Taphozous kachhensis magnus, Wettst.

1914. *Taphozous magnus*, Wettstein, Ann. Vienna, Nat. History Museum, Vol. 27, page 465.

Babylonian Sheath-tailed Bat.

	1 ♂	Amara.	Ingoldby, 29-7-16.
	2 ♂	Amara.	Buxton, 27-10-17.
	1 ♀	Shaiba	Cox-Cheesman, 1-10-16.
1 ♂	1 ♀	Ctesiphon Arch	„ „ 4-10-18.
	1	Busra	Connor, 29-6-18. M. 13.

A sub-species of the Kutch Sheath-tailed Bat.

This is a large bat with tail protruding through the centre of the inter-femoral membrane. The fur is confined to the head and central portion of the body, giving a very naked appearance to the limbs and inter-femoral membrane. The ears are large.

They are plentiful in Shaiba and Amara, and after sunset large numbers can be seen emerging from the houses, winging their way with steady flight to the desert. They are also very quarrelsome and noisy in the houses.

The same bat was described under the name of *Taphozous kuchhensis babylonicus* in 1916 by Thomas, who, owing to the war, had no means of knowing that it had been previously described by Wettstein.

9. Pachyura, Species.

Musk rat.

1 ♀	Busra	Cox-Cheesman, 6-8-18.	
1 ♀	Busra	Whitehead, 1-6-18.	
1 ♂	Kurna	Buxton, 26-3-18.	
1	No locality	Connor, Nov. 1918 M. 6 in al.	
1	„ „	Wall „ „ M. 5 in al.	
1	„ „	Wall, no date M. 4 in al.	very large.
1	Busra	Wall, no date M. 3 in al.	very large.
1	„	Christy, June 1918 in al.	

There are seven specimens in all of the larger Pachyura or musk rats, which seem to represent two forms.

I feel inclined to place together the three made skins and one from Connor in alcohol. This is a gray form and might be indigenous. The other three in alcohol—one from Busra and two without locality are in bad condition—and evidently belong to a larger form. One of these marked M. 3 has the small premolar characteristic of *Pachyura* missing, but whether it has never developed or has fallen out, cannot be positively postulated.

This larger form may well have been imported by shipping, as suggested by Kinnear. The fact that so far all specimens have been obtained on the Shatt-al-Arab, in the area of ports of call of the Indian cargo boats, should not be lost sight of.

It has not been possible to carry the identification further, the whole group of these shrews or musk rats being at present in a state of profound confusion.

Pachyura is an oriental genus—but there is one species—a dwarf found in Europe and a few species in East Africa. They have four premolars—one of which is minute. This small tooth is missing entirely in *Crocidura*.

Crocidura is an African genus with one or two species in Europe and a few in Asia.

10. Pachyura etrusca, Savi.

1822. *Sorex etrusca*, Savi Nuovo Giorm de Lett Pisa i, p. 60.

Pigmy Shrew.

1 ♀	Trenches near	Kut.	Magrath, 30-8-16.
1		Busra	Cox-Cheesman.
1		Busra	Fraser, no date.
1 ♂		Amara	Buxton, 5-8-18.

In the present state of our knowledge of these little known animals there seems to be no alternative but to accept provisionally Savi's name *etrusca*.

Kinnear suggests it may prove to be *Sorex pusillus*, whose length he gives as 2. 4 inches. Gmelin's original description gives the length as 3. 6 inches (German) which is double the size of our largest specimen.

It may be as well to note that our pigmy shrew bears a strong resemblance to some specimens that have recently been sent in from Palestine by Shortridge.

The known range of *P. etrusca* is Spain eastwards to Aden and is now extended to the present locality.

11. Hemiechinus auritus, Pall.

1778. *Erinaceus auritus*, Pallas. Nov. Comm. Acad. Petrop XIV, p. 593.
Long-eared Hedge-hog. Arabic "gunfudh."

4 ♂ 2 ♀	Amara.	Buxton, 19-10-17, etc.
2 ♂	Busra.	Shortridge, 25-3-16 and 27-3-16.
1 ♀	Busra.	Wall, 17-8-16.
1 ♀	Busra.	Wall, 23-1-17 M. 8 in al.
1	Busra.	Cox-Cheesman, 19-6-16.
	a foot.	Culbertson, 22-1-17.
1 ♀	Amara.	Connor, 9-10-16.
1 ♂	Busra.	Short, 6-5-18.
1 ♀	Busra.	Christy, June 1918—Pregnant. in al.

This is the common hedge-hog of the lower Tigris; specimens are still required from Baghdad and above, also from the Euphrates.

Buxton says, "very common in Amara, hybernates 3 months." He obtained 1 young in July. The writer found it plentiful in Sheikh Saad. This hedge-hog might be described as having hair of whitish brown, almost white in places, with light coloured quills and long ears, the feet and forehead are sandy brown.

The genus *Erinaceus* has now been restricted to the European hedge-hog. The genera *Hemiechinus* and *Paraechinus* being accepted for the more Eastern forms. The difference in the two lines in the front line of quills. In *Hemiechinus* the quills and hair meet in a clear cut line across the

forehead, in *Paraechinus* a groove without quills runs from the centre of the forehead towards the crown. A key and description can be found in Summary of the Indian Mammal Survey. Wroughton, pt. ii., J. B. N. H. S., 1918, Vol. XXVI, p. 31.

Trouessart gives the distribution of *H. auritus* as S. E. Europe, Caspian and S. Siberia.

12. Paraechinus ludlowi, Thos.

1919. *Paraechinus ludlowi,* Thomas, J. B. N. H. S., Vol. XXVI., No. 3. p. 748.

Ludlow's Hedge-hog.

1 ♂	Type	Hit. Euphrates.	Ludlow, 8-8-18.

The type is the only specimen seen. Ludlow remarks that it was on stony desert soil at 400 ft. altitude. He also says that he found this within 20 yards of the Euphrates and that the preceding genus *H. auritus* was plentiful at Hit.

Besides the generic difference, this hedge-hog can be distinguished from *H. auritus* by the colour of the quills which are almost white on the sides of the animal, with a broad row of brown quills running down the centre of the back. Most of the hair is white—the tail, feet and nose being brown—with brown streaks running up the forehead. It also appears to attain a larger size.

Mr. Oldfield Thomas has named this after Capt. F. Ludlow.

13. Felis chaus, Guld.

1776. *Felis chaus,* Guldenstädt, Nov. Com. Ac. Petrop XX, p. 483.

Jungle Cat. Arabic "Bizoon."

1 ♀	Amara	Buxton, 2-12-17.
1 ♀	Qualet Saleh	Webster, Jan. 191[illegible]
1 ♀	,, ,,	Buxton, 23-2-18.
1	Mesopotamia	Perrian, Jan. 1917.
1 ♂	Madij	Ludlow, 15-2-18.
1	Shahroban	Mackie, July 1917.
1 ♀	Shahroban	Indian Museum (Connor), Dec. 1918.

This is the cat frequently met with on the Tigris among the scrub-jungles by the river. It grows to such a size that it is easy to mistake it for the jackal at a short distance. Its black ear tufts, yellow tinge of colouring and short tail have led in many instances to the reports of caracals and even lynxes being seen or shot on the Tigris and Euphrates during the war.

So far the only authentic record of the caracal in this neighbourhood, is the specimen obtained by Loftus at Dizful, which I have examined.

The uniform brick-red colour and absence of black or brown markings would distinguish this caracal at a long distance from *F. chaus.*

These specimens vary considerably. Buxton's from Amara has the under-parts white and is a brightly coloured cat, while his and Webster's from Qualet Saleh, although from much the same locality, are less highly coloured, with buff belly. De Winton dealt with the sub-species of this cat in 1898 (A. M. N. H. 7 ii, p. 291) but I have been unable to determine to which sub-species these belong. Buxton's Amara specimen, skin and skull, can be duplicated from the series of *Felis c. affinis* from India, collected by the Indian Mammal Survey, while the Qualet Saleh skins approximate to the British Museum series of *F. chaus nilotica* from Egypt and are also very similar to some among the *F. c. affinis* series. Major St. John

compared a specimen obtained near Bushire with a living member of ***Felis chaus*** in the London Zoological Gardens. He came to the conclusion that they were identical (Blanf. Eastern Persia, ii, p. 36.)

I do not consider the separation of the present series of the Mesopotamian cat from ***F. chaus*** would be justified as yet.

F. chaus is found throughout India, W. Asia and N. Africa. The type locality is the Caspian.

14. Felis ocreata iraki, Subsp. nov.

Pale Eastern Wild Cat.

Type 1, Koweit, Arabia, Shakespeare, May 1913.

1 ♂, Sheik Saad, Tigris, Cox-Cheesman, 8-12-16.

Felis ocreata is, according to Temminck, the origin of the domestic cat and is the Abyssinian representative of a group to which these two specimens belong.

It has been known in literature as ***Felis caligata, Felis maniculata,*** and ***Felis lybica.*** Schwann in 1904 pointed out that the first description of this cat was given by Gmelin, as ***Felis ocreata*** in 1791.

Besides being widely distributed in Africa, specimens have been obtained near Aden by Col. Yerbury in 1895, at Lahej, S. W. Arabia, by Messrs. Percival and Dodson in 1900, and at Moab, Palestine, by Tristram in 1893. All these Asiatic skins are very similar to the African in shade of colour and markings. The two from Koweit and Sheikh Saad although very similar to each other in these respects, are unlike any of the other specimens in the British Museum and obviously represent a paler race. It has been considered advisable to give them subspecific rank.

Felis ocreata iraki, Subsp. nov.

Size similar to Aden and Palestine specimens, with slightly heavier dentition.

General colour dove grey, with tendency to salmon buff shading. Forehead silvery, caused by a subterminal brown ring on the hairs showing past the silvery tip, base of hairs salmon buff. White patch in front of eye. A few buff stripes on the face. Ears uniform reddish buff, a few long reddish hairs at the tips, but no tufts. Back without distinct pattern, colour as on the forehead, darker towards the centre, paler towards the flanks. The buff bases to the hairs showing through on the flanks, form almost invisible spots which lower down become more distinct. Tail long, extending some inches beyond the outstretched hind legs, tip brown black, with two or three brown black rings above separated by greyish white intervals. Belly white, grading to pale buff at the sides and with obscure reddish spots. Legs on the upper side pale creamy white to the toes, thighs and upper fore legs slightly darker with cross bars of pale brown. Underside of the feet brown black.

Dimensions of the type.—Head and body, 630 mm; tail, 372; hindfoot, 134; ear, 47. Skull:—Greatest length, 94; condylo basal length, 83; zygomatic breadth, 64.5; palatal length, 34.5: least interorbital breadth, 17; breadth of braincase (broken), 45; upper tooth row behind canine 22.5; length of carnassial, 11.5; greatest length of bullæ, 22.

Hab.—N. E. Arabia and Mesopotamia. The type from Koweit, Arabia. Another specimen from Sheikh Saad, R. Tigris.

Type.—Apparently a male. B. M. No. 20.1.19.2. Collected May 1913, by the late Capt. W. H. Shakespeare. Presented to the British Museum by the Bombay Natural History Society.

The Sheikh Saad specimen is shorter in the tail than that from Koweit. It was shot in low scrub on the River bank below Sheikh Saad. As this cat appears as a rare straggler within the range of the preceding species, *F. chaus*, with which it might in the field be confused, the chief differences may be emphasized as follows. The tail in typical *F. chaus* reaches little more than half the length of the outstretched hindlegs, in all the *F. ocreata* group the tail extends two to five inches beyond them. The ear of *F. chaus* is deep reddish with a darker patch in the centre and a tuft of long hairs at the tip, in *F. ocreata* the ear is paler, self-coloured, and without the tuft. The hair on the body of *F. ocreata* is distinctly softer. The most marked difference however lies in the skull, which in *F. chaus* is almost twice the size of that of the *F. ocreata* group, with far larger carnassial teeth.

The European wild-cat, *Felis sylvestris*, extends to Asia Minor and will probably be represented in N. Persia, but is not likely to be found on the Mesopotamian plains.

15. Herpestes persicus, Gray.

1864. *Herpestes persicus*, Gray, P. Z. S., p. 554.
Persian Mungoose. Arabic Jeraydee ma'l Nakhala, or 'Abu al arrais'

1 ♀	Amara	Connor,	25-8-16.
2 ♂	,,	Buxton,	21-12-17 & 1-12-17.
1	,,	,,	25-2-18 1918.
1 ♀	Busra	Shortridge,	12-1-17.
1	Baghdad	Ingoldby	Dec. 17.
1	Busra	Connor,	no date M 22 in al.
1	Busra	Wall ,,	,, M 23
1	,,	Christy	June 1918 in al.

This is the common mongoose of the Tigris, at least from Fao to Baghdad. The Arab children tame them easily and sell them as pets for a few annas. Connor remarks that his female from Amara had full grown young following her in August. The first Arabic name, literally, rat of the palm-tree, is misleading, and some men have seriously informed me that they live on dates. But the Arab is not accurate in his observations and seeing a mongoose in a palm tree probably led to this belief.

The type locality is Mohammerah and its range is given from there to Kuzistan. No specimen of a larger mongoose has been so far obtained, but in May 28, 1917, I chased but failed to secure, a large mongoose beyond the oil fields at Maidan-i-Naptun. This might have been an Indian species or even the Egyptian, *M. ichneumon*, which Kinnear points out may reach the country west of the Tigris.

16. Hyæna hyæna, L.

1766. *Canis hyæna*, Linnæus, Syst. Nat. 1., p. 58.
The Striped Hyæna. Arabic Dhab'a.
1 Ur of the Chaldees. Patiala Lancers.

Lt.-Col. Cox, 1/4 Som. L.I., told me he had seen a hyæna in the desert outside Makina near Busra in 1916, and chased it for some distance on a horse. Ludlow tells me that 4 miles N. of Feluja on the left bank of the Euphrates he rode and chased a hyæna to ground The earth was in the side of a mound, self dug, with more than one entrance. Outside there was a large larder of Camel and donkey bones.

These, the only records I have of the hyæna are from the Euphrates.

It is probably met with on the Tigris as well, but will nowhere be plentiful. The desert tribes north-west of Baghdad seemed very vague as to its whereabouts or existence there. Sheikh Feisul ibn Saoud from Central Arabia was well acquainted with them and recognised them at once in the London Zoological Gardens.

The specimen from Ur has been compared with a recent series of *Hyæna hyæna* from India, and appears identical with the exception of being slightly paler. The type locality of the species is Bunder Abbas.

The range is Palestine, Persia, Trans-Caspia and India. Also North Africa.

17. Canis pallipes, Sykes.

1831. *Canis pallipes,* Sykes, P. Z. S., p. 101.
Indian Wolf. Arabic 'Dhib.'

1	Shaiba	Livesey, June 1917.
1 ♂	Tanooma, Busra.	Christy, May 1918.

In addition to the skins sent, wolves have occasionally been seen and killed on the Tigris, their appearance is however rare and I have not heard of their being seen otherwise than singly or in pairs. The wolf sent by Christy was collected by Major R. W. Cooper, who shot it. He states it measured 26 inches and a bit to the shoulder. It had killed sheep from a wire pen several nights in succession at Tanooma.

On comparison with the series of *Canis lupus* and *Canis pallipes,* there is no doubt that the Mesopotamian wolf belongs to the latter species.

A skin and skull of *C. pallipes* was collected near Aden by Percival and Dodson in 1899 and in 1894 Col. Jayakar obtained a skin of *C. pallipes* from near Bunder Abbas, both are now in the British Museum.

Distribution.—Sind and throughout India. The type locality is Dekkan. The occurrence of this wolf in Mesopotamia is a link with those found in Arabia mentioned by Kinnear.

18. Canis aureus, L.

1758. *Canis aureus,* Linnæus, Syst. Nat. 1, 10th ed., p. 40.
Jackal. Arabic Wow-wi.

1 ♂	Kut	Pitman, 13-1-17.
1 ♂	Shaiba	Livesey, Feb. 1917.
1 ♂	Legait	„ 5-4-17.
1	Mesopotamia	„ 16-10-16.
4	Baghdad	Ingoldby, 18-1-18.
1 ♂	Shahroban	Connor, Jan. 1919.
1	„	Indian Museum (Connor), 5-5-19.
2 ♀	Amara	Buxton, 4-11-17 and 17-1-18.
1	Persian Gulf	Evans, 14-2-18.

The skins of Mesopotamian jackals are separable into two groups. Some agree with a series selected from the National collection from the direction of Bunder Abbas, the type locality from which Linnæus described *C. aureus.* Unfortunately the type itself is unknown. The skins in this series were from Bunder Abbas. Rae. 1911. Shush, near Dizful, Woosnam 1905—S. Arabia, Bury, 1902. Fao, Cumming, 1893, and Seistan, Kennion, 1910. These with the present collection from the lower Tigris and Euphrates may be described as bearing a ground colour of pale sandy to pale buff. The larger hairs are brown tipped with a few black tipped. The skin sent from Shaiba by Livesey is an exceptionally pale example, but the coat is old and the variation would be caused by the

fading effect of the Shaiba desert sun on an already pale specimen of *C. aureus.* These would therefore all be referable to *C. aureus aureus.* One of Ingoldby's specimens from Baghdad has no duplicates among any of these. The ground colour here is bright fox-red with black tips to the longer hairs in sufficient numbers over the loins to create the appearance of a black patch. This bright colouring is identical with several specimens from Khotz near Trebizond, and one from Greece. Here we have strong evidence of a dark race coming to Mesopotamia from Armenia and meeting the paler *C. aureus* from the Persian Gulf. At Sheikh Saad Garden in 1917 considerable raids were being made by jackals on the fields of melon and vegetable marrow grown for the troops. When the order was given for their destruction the men killed over sixty jackals in a few weeks.

Buxton remarks "abundunt everywhere. Destroys broad beans by rolling in them in spring, trampling patches quite flat. Eats cucumbers. Litters of cubs, seen under bushes as soon as they can walk."

19. VULPES PERSICA, Blanf.

1875. *Vulpes persica,* Blanford, A. M. N. H., XVI., p. 310.
Persian Desert Fox. Arabic Huseinee.

1.	Legait	Livesey, 20-4-17.
4.	Purchased at Busra	Shortridge, 26-2-16.
1.	Ahwaz	Ludlow, 4-7-17.
1.	Shatt-al-Adhaim	Pitman, Nov. 1917.

These small foxes are grey on the sides merging into fox-red towards the centre of the back and on the legs and forehead. The throat and underparts contain portions of mauve grey.

Livesey's specimen from Legait is a very pale example with the forehead, flanks and brush almost silvery white, touched here and there with chestnut. The tips of the ears and centre of the neck and back are chestnut brown. This would seem to be a case of partial albinism, as there are cases of similar colouring among a series of *V. leucopus* from Sind.

The long brush becomes white tipped with age.

They are plentiful in the desert mounds formed by the ruins of the irrigation canals of the ancients. In these their earths are found, but they more often lie in the open. Their footmarks can be seen round the holes of Jerboas and Gerbills on which they largely prey. I once approached to within a few feet of one—intent on digging out these small rodents. The Arabs course them with greyhounds and sell the skins in the markets. These skins are often called 'bizoon el chowl' which might be misleading as literally it means 'cat of the desert.'

This fox would appear from the specimens to hand to belong to the *leucopus* group, and there is little doubt it is Blanford's *V. persica.*

V. leucopus is found along the Sind, Punjaub frontier, while Blanford gives the habitat of *V. persica* as Persia around Isfahan.

20. MARTES FOINA, Erxl.

1777. *Martes* (*Mustela*) *foina,* Erxleben, Syst. Regn. Anim. I, p. 458, Beech Marten.

1. Push-ti-koh. Napier, July 1917.

The Beech Marten keeps to considerable elevations in the mountains and is not likely to be met with in the plains of Mesopotamia, but it contributes to the interest of the paper to include specimens obtained just over the Persian border. Unfortunately there is no skull and the skin has the appearance of a bazaar purchase which would account for the exact locality not being given.

There seems to be little known regarding the Martens in this region although they occur in the highlands of Asia Minor. Major St. John remarks "I am told that Marten skins are commonly sold at Ispahan, said to come from the Westward. But whether this means Asia or the forests of the Zagros I cannot say" (Blanford's Eastern Persia, II, p. 44). The Zagros is an old name for the Push-ti-koh. He assumes that these skins were *Martes abietum*, a synonym of *Martes martes*, the Pine Marten, a species which has a larger amount of white on the throat patch, but reliable identification rests on skull differences.

Martes foina has a range from central and southern continental Europe to Western Asia, also Afghanistan and the Himalayas.

21. Mellivora wilsoni, sp. nov.

Wilson's Ratel.

1 ♀ Baksai, Tyb River, Iraq—Persian Frontier. Wilson, May 1914.

The material representing *Mellivora indica* in the British Museum is most meagre. On comparing the present specimen with what is available and with the series from Africa, I find that it shows a number of differences from both, which, though not great in themselves, are so constant that the erection for it of a new species seems justified.

For comparison below I have used a specimen obtained by the Mammal Survey of India from Bengal. The dimensions given in brackets are those of this specimen which unfortunately is a ♀.

Mellivora wilsoni, sp. nov.

A *Mellivora* having the mantle extending almost to the tip of the tail, as in *indica*, but the mantle showing a marked white border along the shoulders and flanks as in so many of the African forms.

Size rather smaller than *indica* (even allowing for the difference in sex of the two specimens compared) with a rather longer tail proportionately.

General colour black with a greyish-white mantle commencing from between the eyes (commencing rather behind the line of the eyes in *indica*) and extending over the entire back and upper side of the tail almost to its tip; bordered by a white band, about 20mm. wide, from the ears along the flanks. The individual hairs of the mantle are pure white to their bases, rather sparse and about 30—35mm. long. Everywhere these overlie a finer, shorter coat of brown hairs (except in the marginal border where they are absent) and these seen through the white hairs give the effect of grey colour to the mantle. On the marginal border the white hairs are closer set, and longer (40—45mm. on flanks), which with the absence of the underfur accounts for the contrast between the margin and the rest of the mantle. The claws are black.

Dimensions of the type.—Head and body, 595 mm. (705); tail, 175, (175); hindfoot, 100, (120); ear 19, (19 from dry skin). *Skull.*—Condylobasal length, 122, (133); palatilar length, 56, (55); interorbital breadth, 32, (28); breadth of brain case, 58, (62); upper tooth row behind the canine, 27, (28); length of carnassial, 11. 5, (13).

Hab.—S. W. Persia, the type from Ram Hormuz, alt. 500.

Type.—Adult ♀ B. M. No. 5,10-4-21. Original number 24. Collected 4th April 1905, by Mr. R. B. Woosnam and presented to the National Museum by Col. Bailward.

The specimen taken by Col. A. T. Wilson near Baksai, some distance further N. W. and sent for identification to the British Museum by the Bombay Natural History Society corresponds closely, in all essential characters with the description of *M. wilsoni* so far as the absence of the skull

allows me to judge. The pattern is quite the same. The general black body colour has rusted to a deep brown, except in the centre of the belly, while the pure white hairs on the mantle of the type are altered in this specimen to a creamy white. The claws are cream coloured. Dimensions of the Baksai specimen :—Head and body, 741mm ; tail, 191 ; hindfoot, 102. *Mellivora* from Aden have the mantle darker grey than *M. wilsoni* and the grey of the mantle extending only a short way down the upper surface of the tail, this is more characteristic of the African forms.

The Baksia specimen was caught in open desert, while that from Ram Hormuz was trapped at a hole in a bank among corn lands.

I have named this species in honour of Lieut.-Col. Sir A. T. Wilson. Owing to the absence of the skull it was found necessary to take Col. Bailward's specimen as type of the species.

22. Lutra lutra, L.

The Common Otter.

1. Amara. Christy, June 1918. Obtained from an Arab.
Arabic "Keleb-al-mi"

This proves to be the common otter, *Lutra lutra,* as predicted by Kinnear.

Buxton says :—The marsh Arabs spear them by moonlight with a trident. So far otters have been most in evidence in the marshes in the lower reaches, but there is little doubt that they are found throughout the length of the larger rivers.

Distribution :—Miller gives the range of *Lutra lutra* as N. Africa, eastward into Asia, and westward in Europe to Ireland and north to the Arctic Coast.

23. Jaculus loftusi, Blanf.

1875. *Dipus loftusi,* Blanford, A.M.N.H., XVI., p. 312.
Loftus Jerboa. Arabic Jerboor.

1 ♂	Busra, Cox-Cheesman,	12-10-18.	
	„ „	21-10-18	skeleton and skull in al. M. 19.
1	„ „	28-10-18	in al. M. 1.

These are the size of a half grown rat.

The kangaroo like legs and thick fur below the feet, of three toes, are the chief characteristics noticed here. Colour of back isabelline, darker towards the tail and white below. The tail is isabelline with a tuft of dark hair ending in a white tip.

These two specimens were kindly given to me alive by Capt. Turner in June 1917 and lived sometime in the collection at Bombay. He obtained them from the line of the Busra-Nasariyeh Railway. During the heat of the day these animals would frequently fight in their cage, make an angry spitting noise like a rabbit when fighting and suddenly fall into a trance like sleep, from which they required a considerable shaking to awaken. They drank frequently, taking small sips in their forepaws. This is remarkable as their earths are often placed where both dew and water would be to all appearances unobtainable.

They usually remove the sand in front of their burrows by pushing it in front of them with their fore feet. For the excavation they adopt the more usual method, *i.e.,* backwards.

The Jerboas are considered eatable by Mahommedan law, the other small rodents are 'haraam' or forbidden.

Blanford gives a plate of this animal in his 'Eastern Persia,' ii., p. 75. In his description in 1875 he mentions that it is distinguished from its allies by its colour and proportion.

Distribution.—Persia and Mesopotamia. According to Trouessart Loftus obtained the type at Mohommerah.

24. Tatera bailwardi, Wroughton.

1906. *Tatera bailwardi*, Wroughton, A. M. N. H., Ser. 7, XVII., p. 498.

Bailward's Gerbil. (Bundi Kir, Karun River)

6 ♂	Amara	Buxton, 22-11-17 to 12-10-18.
♂	Sinn Abtar Kut	Shortridge, 6-7-16.
1	Mesopotamia	Bagnall, 12-2-17.
1	Baghdad	Ingoldby, 18-12-17.
3 ♂	Akka Kuf	
	Baghdad	Pitman, 27-7-17.
imm.	„	„ 14-8-17.
3 ♂ 1 ♀	Sheikh Saad	Cox-Cheesman, 24-2-17 to 5-3-17.
1 imm.	„ „	„ 14-3-17.
1	Shahroban.	Indian Museum (Connor), Jan. 1919.

In the Gerbil family the hind foot is long, but the hind legs are considerably shorter than in the Jerboas. This is the most numerous of the Gerbils so far met with on the Tigris at Baghdad and below. It is the size of a rat with large black eyes, soft sandy brown hair, with rufous tinge and speckled with black-brown. Underparts white. The long tail is dark brown above and below and pale at the sides and well covered with hair. This tail marking distinguishes *Tatera* from all other Gerbils.

Buxton remarks that his specimens were taken with cheese and were common among lucerne patches.

Mine were flooded out of burrows made below freshly sown garden peas, on which they were probably feeding.

Distribution.—Lower Tigris, Euphrates and Karun rivers.

25. Tatera pitmani, sp. nov.

Pitman's Gerbil.

1 ♀ Type. Baiji near Fatah Gorge, Tigris, Cox-Cheesman, 18-4-19.
1 ♂ „ „ „ „ „ „ „

A larger species than *T. bailwardi* with less rufous on the back and flanks.

The chief distinction is the difference in proportions. The skull of *T. pitmani* being considerably the larger, while the feet of both are about the same size.

Upper surface of back sandy brown, well speckled towards the centre with black brown caused by the brown tips of the hairs. Base of hairs dark grey. A light area around the eye clearly defined, some of the hairs being white to their bases. Under surface white, the lateral line of demarcation not specially sharply defined.

Ears similar to back but darker. Hands and feet white, tail dark brown above and below, pale buff at the sides of the basal half of the tail, terminating in a dark brown tip with elongated hair.

Dimensions of the type.—Head and body 194 mm.; tail 184 mm.; hind foot 41 mm.; ear 29 mm.

Skull.—Greatest length 49·0 mm.; condylo incisive 45·0; zygomatic breadth 26; nasals 22; interorbital breadth 8; palatine foramina 9·8; upper molar series 7·2.

Hab.—The rocky soils and foothills of the Jebel Hamrin range on the N. Eastern boundary of the Iraq plain.

Type.—Adult female B. M. No. 19-12-24. 1. Original number 390. Collected by R. E. Cheesman at Baiji, Tigris, April 18, 1919. Another specimen from the same place.

The measurements of the male are:—head and body 203 mm, tail 194; hind foot 41; ear 26. The skull is also larger than that of the type, but was unfortunately incomplete.

The skull measurements are larger than those of the type of *Tatera persica* which is in turn as large or even larger than either *T. toeniura* or *T. indica*, according to Wroughton.

This Gerbil will be found to be akin to *Meriones toeniurus* described by Wagner in 1843. The measurements were those of a stuffed specimen, without skull, the type locality being given as Syria.

Wroughton when writing on the genus *Tatera* in 1906 (A. and N. M. H. ser. 7 XVII, p. 495) deduced that Wagner's description was too vague to indicate more than a large *Tatera*. Unfortunately there are no specimens from Syria in the National collection.

Of the specimens of *Tatera* obtained by Col. Bailward at Bundi Kir, Karun River, Wroughton identified two of the larger with *T. toeniura*. The average measurement in mm. was head and body 187; tail 197; hind foot 42; ear 29. Skull greatest length 47; length of upper molar series 7.

Three smaller specimens from the same collection and one from Loftus; from the same locality and one presented by the Euphrates Expedition, he describes under the name of *T. bailwardi*. The type, a male, measured head and back, 166 m.m.; tail 182; hind foot 41; ear 28; skull greatest length 44; upper molar series 6·5. Since the arrival of the present series of *Tatera* in the Mesopotamian collection we are able to form the opinion that *Tatera toeniura* does not extend across the desert from Syria to the North-Eastern boundary of Mesopotamia as we now have evidence that in the intervening country on the Lower Tigris and Euphrates the resident species is *T. bailwardi*, to which all *Tatera* obtained at Baghdad and below on the Tigris are referable. It appears safe to assume that the two specimens from Baiji belong to a hitherto undescribed species with a range on the rocky soils above the alluvial Iraq plain.

They inhabit burrows in patches of sandy soil in the vicinity of river banks. I have named this species in honour of Capt. C. R. S. Pitman.

26. Gerbillus cheesmani, Thos.

1919. *Gerbillus cheesmani*, Thomas, J. B. N. H. S., Vol. XXVI, No. 3, p. 748.

Cheesman's Gerbil.

♂. Type Lower Euphrates. Cox-Cheesman, 21-8-17.

This Gerbil was captured on the Busra-Nasariyeh Railway by Capt. Turner, who generously presented it to me. It was taken alive to Bombay. In general colour and size it resembles a brightly coloured dormouse. The edge of the pale chestnut of the back and the white of the underparts meeting in a clearly marked line along the side. The chestnut continues between the ears to a point towards the nose. The hair round the eyes being much lighter.

Mr. Oldfield Thomas has kindly named this after the writer.

27. Dipodillus dasyurus, Wagn.

1842. *Dipodillus dasyurus*, Wagner, Arch. Naturg. i., p. 20.

Dasyurus Naked-soled Gerbil.

1♂	1♀	Baghdad	Buxton, 11 & 12-9-17.
3♂	1♀	Amara	,, 15-9-18 and 7-11-18.

These are small Gerbils about the size of dormice. The two from Baghdad are pale chestnut on the flanks, shaded to brown towards the centre of the back with underparts white. The tail is darker above than on the side or below. In the four from Amara the general colour of the back is browner than in those from Baghdad.

Buxton remarks from Baghdad "trapped on bare mud banks of the Tigris with bait of flour paste" and from Amara he says "apparently common in bare salt desert with a few bushes of *Suæda*." *Suæda monoica* is the common salt loving shrub. He also says "I kept a lot in captivity and they fed almost exclusively on the succulent leaves of this plant.

The burrows are not complicated having 3 or 4 entrances, all within 3 or 4 feet of each other.

The holes descend very steeply to about 12 to 18 inches below ground level.

When you attempt to dig out these animals they scratch their way out of the burrows, into the surrounding earth and definitely block the track they have excavated. If you follow the main burrow you dig past the occupants, which are lying up a few inches away in the soil."

In the present state of our knowledge of this genus it is not safe to go further than provisionally to place these under *D. dasyurus*.

Trouessart gives the distribution of *D. dasyurus* as Arabia, Red Sea and Oman.

28. Meriones charon, Thos.

1919. *Meriones charon*, Thomas, A. M. N. H. Ser. 9, Vol. III, p. 269.
Karun Desert Gerbil.

1 ♂	2 ♀	Kazimain, Baghdad.	Cox-Cheesman,	18-1-19.
1	imm.	Beled, Tigris.	„ „	21-10-18.

Another of the Gerbil family: slightly larger than the last.

These were living in earths on the dry banks of irrigation channels among cornland and were trapped with a bait of cocoanut. I have extracted a few sentences from Thomas' description of *M. charon*. "Small, with terminally crested tail, general colour above finely speckled sandy buff, under surface white, tail dull buffy with an upper crest of black hairs."

These have been compared with a series of *Meriones erythrourus* from Shiraz and Kandahar, the reddish colour at the base of the tail is a character of *M. erythrourus* and missing in the Mesopotamian specimens, which also appear to belong to a smaller species.

To *Meriones charon* the resemblance is much closer. This species was found by Loftus on the mounds of Susa, and Woosman obtained the type at Ahwaz, Karun river. As none of the skulls of the Tigris specimens show adult formation, it has been considered advisable for the present to place them provisionally under *M. charon*.

29. Rattus rattus, L.

1758. *Mus rattus*, Linnæus, Syst. Nat., 10th ed., p. 61.
Black Rat. Arabic 'jeraydee.'

N.B.—This name applies to all rats and most small rodents.

2 ♀		Kazimain, Baghdad.	Cox-Cheesman, 30-3-19.
1 ♀		Busra	Kilminster, 17-5-18.
1 ♂		„	Whitehead, 12-5-18.
1 ♂	1 ♀	Amara	Buxton, 6-11-17 & 27-11-17.
1 ♀		Busra	May, 22-5-18.
1 ♂		Amara	Indian Museum (Connor), Sep 1916.

The long tail and small size should distinguish this species from the next. This rat is a tree loving species and is frequently seen passing from date tree to date tree by the fronds.

Buxton found it common in houses at Amara.

Hinton has dealt with the *Rattus* group recently in the Journal of the B. N. H. S. of Dec. 20, 1918, No. XVIII. Although many species and sub-species of the house rats have been separated under different names from time to time, in many cases he has been unable to distinguish them specifically.

As instances occur of the black rat being brown and the brown rat being black, I have asked Hinton to identify the *rattus* specimens from Mesopotamia and he has placed them in the two species given—that is *Rattus rattus* and *Rattus norvegicus.*

This rat originally came from India and spread westwards. In Mesopotamia it should be more or less in its original form. It was first taken to England by the Crusaders and also scattered about the world by shipping. Considerable changes of colour and habits have since taken place.

30. RATTUS NORVEGICUS, Berkenhout.

1769. *Mus norvegicus*, J. Berkenhout, Outlines Nat. Hist. Gt. Britain and Ireland. 1, p. 5.

Brown Rat.

2 ♂	2 ♀	Busra	May, 8-5-18 to 26-5-18.
	1 ♀	,,	Whitehead, 4-5-18.
	1 ♂	,,	Jenkins, 26-5-18.
	1 ♀	,,	No name, 5-5-18.
	1 ♀	,,	Collins, 13-5-18.

The large rat with tail shorter than length of head and body.

This rat originated from S. Russia in the region between the Caspian and Lake Baikal. It has spread like *Rattus rattus* by means of shipping, to all parts of the world and likewise dark and light forms have been evolved by change of environment.

It is interesting to note that no specimens were obtained higher than Busra.

51. NESOKIA BUXTONI, Thos.

1919. *Nesokia buxtoni*, Thomas, J. B. N.H.S., Vol. XXVI, No. 2, p. 422, Buxton's Mole Rat.

1 ♂		Amara	Buxton, 24-4-18.
4 ♂		,,	,, 31-3-18 to 30-9-18.
3 ♂		Kurna	,, 17-5-18 to 17-7-18.
3 ♂		Lake Akkar, Kuf, Baghdad	Pitman, 27-7-17 to 18-8-17.
1		Sheikh Saad,	Ingoldby, 18-3-17.
2 ♂	1 ♀	,,	Cox-Cheesman, 26-2-17 to 19-3-17.
	1 ♀	Nasariyeh	Indian Museum (Hodgart) January 1918.

The four skins from Sheikh Saad differ from the rest in the quality of the fur which lacks the inter-mixture of black stiff hairs and the coats are therefore softer in texture.

These mole rats somewhat resemble the English water vole in general appearance.

They may be recognised by the rather short tail, almost hairless, and the enormous length of the rodent teeth. Their hair is soft, golden brown on the back with long black hairs of coarser texture inter-mingled. The underparts are grey white.

Buxton remarks from Amara, they are common but very difficult to trap. He trapped one with cheese, but the rest of his specimens were shot at the mouth of the burrow. He adds: "during the spring floods, they excavate hard even by day light and come to the surface to throw out earth". I also found them difficult to trap and my specimens from Sheikh Saad garden were dug out of their holes by a gang from a Santali Labour Corps, who proved experts at catching them alive in their hands and were sorely disappointed that they were not allowed to eat them.

They live in colonies in holes in dry banks of canals. Their holes are always stopped at the entrance with loose earth. So anxious are they that the holes shall be closed, that I used to remove the loose earth. Very shortly a head would appear and the damage be immediately repaired.

The nearest ally in colour to *N. buxtoni* is *N. huttoni* from Kandahar, an illustration of which appears in Blanf. Eastern Persia ii, p. 61, a neighbouring species.

Nesokia bailwardi from S. Caspian is a dark wood brown.

Mr. Oldfield Thomas has named the Mesopotamian species after Capt. P. A. Buxton.

32. Mus musculus gentilis, Brants.

1827. *Mus gentilis*, Brants, Muizen, p. 126.
House Mouse. Arabic 'Fars.'

8 ♂	5 ♀	Amara	Buxton, 27-11-17 to 8-9-18.
1 ♂		Sinn Abtar, Kut	Shortridge, 5-7-16.
1		Busra	Cox-Cheesman, May 1916.
1 ♂		Twin Canals	,, 15-11-16.
1 ♂	1 ♀	Sheikh Saad	Cox-Cheesman, 26-2-17 & 4-3-17.
	1 ♀	Busra	Kilminster, 22-5-18.
1 ♂	1 ♀	,,	Whitehead, 15-5-18 & 20-5-18.
2 ♂	1 ♀	,,	May, 27-5-18 & 28-5-18.
1		Amara	Wall, M. 10 in al.
1		,,	Connor, M. 11 in al.
3		Busra	Christy, June 1918 in al.

These mice are found in the fields as well as in houses, and often turned up in tents in the most distant desert camps. Among the specimens received were several tending to a chestnut brown coloration on the back. The majority were brown.

Blanford obtained a specimen of *Mus bactrianus*, the Kandahar house mouse, from Shiraz and mentions that he expects that this will be the house mouse of S. Persia.

Mus musculus musculus of Linnæus, the common house mouse of Europe, although originating from Central Asia, has now been carried all over the world. Typical forms of this have recently been taken at Menjil, N. W. Persia, by Buxton.

Mus musculus gentilis, an Eastern form of the common house mouse is found in Egypt. A rough guide to these three forms is belly dark, with slate coloured bases, to hairs, *Mus. m. musculus*. Belly whitish, but with slate bases to hairs, *Mus. m. gentilis*. Belly white, with white bases to hairs, *Mus. bactrianus*. The tails of the Mesopotamian specimens from measurements in the flesh, average 76·5 m.m. which is eleven mm. shorter than a series recently collected by Hotson in Shiraz. Several Mesopotamian specimens have the pure white underparts of *M. bactrianus*.

33. Acanthion, Species.

Porcupine. Arabic Necce or Da'alej.

1 ♂ 1 ♀. Bait-al, Khalifa, Samarra, Pitman, 1-2-18.

Pitman's two specimens are browner than either *Hystrix cristata* from Europe or *Acanthion leucura*, the common Indian porcupine. One of the Samarra skins had both hind feet white.

The porcupine is sparingly distributed among the rocky undulations and hills, but there is no record of its appearance on the plains. I have seen porcupine quills in the caves of the hills between Samarra and Tekrit on the right bank of the Tigris. On the mounds of Susa near the Kerkha river there was a well used earth of this animal with beaten tracks leading to it.

Blanford originally placed the Persian porcupine with *H. cristata*, but subsequently identified it with *H. leucura*.

The porcupines formerly called *Hystrix* are now divided into two genera. *Acanthion* which includes those from India, and *Hystrix*, comprising the African, as well as the porcupine found locally in the Mediterranean region of Europe.

Muller has lately published a paper S. B. Ges. Nat. Fr., Berlin, 1911, p. 110, describing six new sub-species of the Asiatic porcupines. It is not at present known how many of these will prove valid. As his paper covers the present area I have perforce to leave the species open.

34. Lepus connori, Robinson.

1918. *Lepus dayanus connori*, Robinson, Rec. Ind. Mus. XV, pt. 11, No. 6.

Connor's Hare. Arabic "arneb".

7.		Hindiyeh Barrage, Euphrates	Pitman, 2-7-17 to 13-7-17
1 ♂	1 ♀	Kut	,, 13-1-17
1		Shat-al-Adhaim	,, 30-9-17
	1 ♀	Jilam plain, N. Samarra	,, 4-2-18
	2	Frontier of Arabistan	Wilson ....
1 ♂		Feluja, Euphrates	Ludlow, 7-1-18
1 ♂		Hit ,,	,, 14-4-18
1		No locality	Arthur, 1919.
1 ♂	2 ♀	Amara	Buxton, 27-1-18 & 11-2-18.
2 ♂		Kumait, Tigris	,, 28-2-18.
	1 ♀	Shahroban	Connor, Jan. 1919.
1		Twin canals	Graham, 28-11-16.

The Iraq hare is inseparable from specimens obtained by Woosnam on the Karun river at Bundi Kir.

Robinson in 1918, described a hare obtained between Ahwaz and Mahommerah by Connor. To this it would seem the present species should be referred.

There are two distinct phases of colour in the present series ranging from a ground colour of grey to that of rufus. Even the grey individuals show a tinge of rufus on the flanks, throat and nape of the neck.

I have not been able to discover any constant difference in the skulls, nor do the dates give an explanation that the two phases are due to seasonal change of coat. It must therefore be assumed that these are merely colour variations.

Ludlow's specimen from Hit has features distinct from the rest. It is small with a golden buff ground colour. The tips of the hairs are silvery buff. Black tibs and centres to the hairs do not enter into the colour composition of the back as it does in all the rest.

The size may be due to its being a leveret, but there is no skull to decide this.

The arrival of more specimens of this little golden hare from Hit will be awaited with interest.

The examples obtained on the Tigris have been compared with Palestine and Arabian species. All and the Samarra specimen in particular, bear a strong resemblance to a series from the Dead Sea. A series of six *L. craspedotis*, the Beluch hare lately arrived from Hotson in Persian Beluchistan was compared with five Tigris hares from Buxton.

The average head and back measurements taken in mm. in the flesh were *L. connori* 472 mm. against *L. craspedotis* 411 mm. Ear measurement *L. connori* 105 mm. against *L. craspedotis* 123·3 mm. The Tigris hare is therefore a large bodied, slightly rufus hare with small ears; while *L. craspedotis* is a small bodied grey hare with very long ears.

Lepus connori differs from *L. dayanus*, a Sind species in three distinct features. The hair of *L. connori* is long and soft, the upper part of the tail is black and the nape of the neck fox red. *L. dayanus* has short hair of coarser texture. The upper part of the tail is sandy brown and the nape of the neck grey. The comparison of a series of both brings conviction that the Iraq hare is worthy of specific rank and should not be associated with *L. dayanus*. From this it is also geographically separated by a very distinct hare *L. craspedotis* as we have seen.

The range of *L. connori* is at present the lands of the Lower Karun, Tigris and Euphrates rivers.

35. Gazella marica, Thos.

1897. *Gazella marica*, Thomas, A.M.N.H. Ser. 6, Vol. XIX, p. 162.

The Marica Gazelle. Arabic 'gazaal' and 'Dhabi.'

1 ♂ 2 ♀	Busra	Dep. Civil Commissioner, 28-3-18 to 16-12-18. Died in Victoria Garden, Bombay.
1	Nasariyeh	Livesey, 4-7-17 skin without mask or skull.
1 ♂ 1 ♀	Shushtar	Bailey, skulls.
1 ♂	Ahwaz	Ludlow, 3-7-17, skull.
1 imm.	Amara	Buxton, spring, 1918. Skin.

The gazelles have taken more time than any other group of animals in the collection. Partly because the whole position of the Gazelle family, especially in this area, is in need of expert revision. Little reliance can be placed on previous works on the subject as the series on which they are based are small.

Perhaps it will be more helpful in this paper to note briefly the chief features of the geographically neighbouring species with which the Mesopotamian skins have been compared, and the conclusions arrived at.

Any of the species mentioned may occur in Mesopotamia.

The species compared were:—*G. arabica*. *G. subgutturosa* and *G. marica*.

The Arabian gazelle, *G. arabica*. This is a small race, the forehead and nose are bright chestnut. Females horned. Inhabits the deserts of Oman N. of Aden and Western Arabia.

The lower Mesopotamian gazelle lacks the chestnut on the head and has indistinct brown face streaks with a tendency to whiteness increasing with age. It is also larger.

The Persian gazelle, *G. subgutturosa*. These were long coated, with distinctly brown coloration. The forehead was brown, in some specimens white hairs were intermixed.

An extract from a description of *G. subgutturosa* by Lyddeker and Blaine is, males with a goitre like swelling in the throat during the rutting season, color dark sandy faun in summer. In winter much paler. An indistinct dark flank band. Face markings indistinct, the median dark stripe fading into white with age. Females without horns.

It has a range in Persia and Afghanistan, at elevations of 3,000 to 7,000 ft.

The specimens under review differ from these, being shorter in the coat. The color of the Busra skins is sandy with a tendency to pinkish, the legs are almost white, while those of the Persian gazelle are reddish brown and we have a horned female from Major Bailey at Shushter and also from the Deputy Civil Commissioner, Busra.

The description of *G. marica* by the same authors is a pale coloured desert form with white forehead, fawn face streaks nearly obsolete, ears, long-whitish fawn on backs, pale flank bands nearly obsolete. Females with horns.

Range—desert tract from Nejd to W. Oman.

The specimens from lower Mesopotamia include a complete skin, skull and mask of a beautiful adult male from the Deputy Civil Commissioner at Busra. The skin in all particulars, especially in the white nose and forehead, closely resembles the type of *G. marica* in the National collection. The horns of this type are those of a younger animal and are in consequence much smaller. The male skull and horns from Shushter resemble the Busra head. The female from the same locality is that of an adult and is horned. The young male from Ahwaz has horns identical with those of the type of *G. marica*.

The skin from Nasariyeh is much paler than the Busra colouring, but may be young.

These particulars in addition to the resemblance of the Busra skin to this type, have led me to place the lower Mesopotamian gazelle with *G. marica* for the present.

36. Gazella, Spec.

4 ♂	2 ♀	Samarra	Pitman,	skulls
2 ♂	2 ♀	,,	,,	13-1-18 masks.
6		Mesopotamia	,,	13-3-18 masks.

The heads obtained in Samarra are those of a smaller gazelle than those from lower Mesopotamia. The horns are lyrate in form and of a lighter build. Unfortunately no skins accompanied them. There are two skulls with perfect horns of old males. Two are those of adult females and are without even rudiments of horns. The four masks from Samarra have brown face streaks with a tendency to grizzled white. The six masks marked Mesopotamia, are nearly all white. The whiteness of the heads of gazelles seem on the plains around Tekrit and Samarra and of masks obtained in this neighbourhood and examined by the writer in Mesopotamia has always appeared remarkable. In addition to the neighbouring species previously mentioned under *G. marica* I have compared these with *G. dorcas, G. muscatensis, G. benneitii* and *G. gazella.*

The Dorcas gazelle, *G. dorcas,* has bright chestnut on forehead and nose, general colour dark-red fawn extending down the legs with a pronounced dark flank band. Female horned. Habitat given in "The Book of the Antelopes." Sclater and Thomas as Tripoli, Morrocco through Egypt and Syria.

The Muscat gazelle, *G. muscatensis,* is much the same in size and colouring. Female horned, A resident of Oman Eastern Arabia.

The Indian gazelle, *G benneitti*—the Chinkara—the horns are short and not lyrate. Female horned. *Habitat.*—From India through Baluchistan and to the shores of the Persian Gulf.

Palestine gazelle. *G. gazella*—bright chestnut on forehead and nose. *Habitat* Syria.

In all these the bright chestnut on the nose and forehead is quite distinct from the facial colouring of the Samarra masks.

The horns of the Samarra gazelle are more delicate than any now in the National collection and I am of opinion that it will prove a new species of which the Females are hornless. In this Mr. Oldfield Thomas agrees. As it will probably be allied to *G. subgutturosa*, the goitre like swelling on the throat of the males during the rutting season, should be looked for and noted. It would also be of value to know if the hornless females from Samarra and the horned females from lower Mesopotamia are constant features.

37. Ovis laristanica, Nas.

1909. *Ovis laristanica*, Nasanov, Bull. Ac. Sci. St. Petersb. p. 1179.

Laristan Red Sheep.

1 ♂ imm. Baktyari, W. Persia. Scott, June 29, 1911.
1 ♂ imm. no locality. . Arthur. Reed . Bombay, 31-3-19

This material is insufficient for any but provisional conclusions.

The nearest described species of wild sheep are *Ovis orientalis ispahanica*, Nasanov, type locality Ispahan, and *Ovis laristanica*, Nasanov, type locality Laristan, S. Persia.

There are no specimens of either in the National collection. Lydekker in his "Catalogue of Ungulate Mammals," Vol. 1, p. 83, 1913, provisionally allows the Laristan sheep specific rank.

I have had the advantage of seeing an excellent series recently collected by Hotson in Baluchistan and Shiraz, which has been sent to the British Museum for identification, by the Bombay Natural History Society. This, in my opinion, links the Red Sheep of the Push-ti-koh with that of Afghanistan, the type locality of the Afghan Urial, *Ovis vignei cycloceros*, with which the specimens from Baluchistan and Shiraz agree.

The difference between the two groups, *Ovis orientalis* and *Ovis vignei*, are well marked in typical adult specimens. *O. orientalis*, Red Sheep, has hornless females and the curve of the horn of the male if continued from the end points over the shoulder. In *O. vignei*, the Urial, the females have small horns and the horn of the male curves forward, the point being in front of the eye. The subspecies of both are separated chiefly on size, and geographically.

The *Ovis orientalis* group, type locality Cyprus, extends through Asia Minor and Transcaucasia to Persia. A subspecies on the Elburz Mountains has been named *O. o. erskinei*.

The *Ovis vignei* group, type locality Astor near Gilgit, extends through the Salt Range, Punjab, to Afghanistan, where we have the subspecies *O. v. cycloceros* to which the specimen from Baluchistan and Shiraz are at present referred, as they have the typical horn of the *vignei* group and the females are horned.

It seems unlikely that in face of the facts revealed by Hotson's specimens that a subspecies of the group with hornless females should crop up at Ispahan, therefore Nasanov's *Ovis orientalis ispahanica* should be accepted with caution until a confirmatory series of specimens is forthcoming from that locality.

Blanford, in "Eastern Persia", quotes Major St. John:—"I believe, myself, that it will be found that *O. gmelini* is confined to the Elburz and that *O. cycloceros* extends from Baluchistan to Mesopotamia". As *O. gmelini* belongs to the *orientalis* group and *O. cycloceros* to the *vignei* group this quotation seems about to be proved prophetic.

Specimens from Budjnurd near the Persian-Turkestan Frontier are of the larger forms of the *vignei* group, and are referred to *O. v. arkar*, a subspecies from the Ust-Urt plateau, Transcaspia.

38. Capra aegagrus blythi, Lyd.

1898. *Capra aegagrus blythi*, Lydekker. Wild Oxen, Sheep, and Goats, p. 264. Sind Wild Goat.

♀ 1. Shushtar..W. Persia..Bailey, Recd, Bombay, 23-2-18 (skin without skull).

As the only specimen is a female without skull, I have been obliged to assume the probability of the Push-ti-koh wild goats being the same as those recently sent by Hotson from Shiraz, in order to give even an approximate classification.

Capra aegagrus blythi is a smaller subspecies than that found in the Caucasus and Asia Minor, viz., *Capra egagrus egagrus*, and has a slighter development or even absence of the knobs on the front edge of the horns and this latter is also sharper in *C. æ. blythi*.

The type locality of *Capra egagrus blythi* is Sind and since the arrival of Hotson's specimens its known range can be extended to Baluchistan and Shiraz.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 20, 1920.]

A LIST OF SNAKES FROM MESOPOTAMIA.

COLLECTED BY MEMBERS OF THE MESOPOTAMIAN EXPEDITIONARY FORCE, 1915 TO 1919.

BY

G. A. BOULENGER, LL.D., D.Sc., F.R.S.

WITH FIELD NOTES BY CAPT. C. M. INGOLDBY.

TYPHLOPIDÆ.

1. *Typhlops braminus*, Daud.
Basra (Lieut.-Col. F. Wall).
Habitat: Southern Asia; Islands of the Indian Ocean; South Africa; Mexico (probably transported by human agency).

GLAUCONIIDÆ.

2. *Glauconia macrorhynchus*, Jan.
Faleya, Euphrates (Capt. H. T. Mackenzie).
Habitat: Algerian Sahara, Nubia, Mesopotamia, Persia.

BOIDÆ.

3. *Eryx jaculus*, L.
Basra and Sheik Saad (Lt.-Col. F. Wall); Amara (Capt. P. A. Buxton); Shaiba (Lt. T. Livesey); Basra (Capt. C. R. Pitman); Bagdad (Capt. C. M. Ingoldby); Mesopotamia (Maj. Fitzgerald).
Habitat: North Africa, S. W. Asia, S. E. Europe.
Very common along the Tigris within a mile or so of the river especially near villages. Excepting *Trop. tessellatus*, the most commonly killed snake owing to his frequent appearance above ground in daylight and his sluggish movements. The largest I have measured was 2 feet 5¼ ins. in length.—C.M.I.

COLUBRIDÆ.

4. *Tropidonotus tessellatus*, Laur.
Basra (Lt.-Col. F. Wall, Lt.-Col. F. P. Connor); Quelat Saleh below Amara, Sheik Saad, Haquicole on Euphrates near Hamar Lake (Capt. C. M. Ingoldby); Faleya (Capt. Mackenzie); Zobeya (Capt. Pitman); Basra (Maj. C. Christy).
Numerous specimens, nearly all with a single upper labial shield (the fourth) entering the eye.
Habitat: Europe and Asia as far East as the extreme West of China and the extreme North-West of India, Asia Minor, Transcaucasia, Persia, Mesopotamia, Syria and neighbouring parts of Sinai and Egypt.
Abundant wherever there is water. Major F. E. W. Venning who collected the specimens from the Hamar Lake, on the Euphrates, has told me that on warm days the shallow water edging the lake appears to be writhing with them.—C.M.I.

5. *Zamenis gemonensis*, Laur, var. *asianus*, Boettg.
Basra, Amara, Bagdad, Haquicole (Lt.-Col. F. Wall); Faleya (Capt. Mackenzie); Basra (Maj. C. Christy).
Habitat: This form is known from Asia Minor, Rhodes, Cyprus, Syria and Persia.

This exceedingly handsome snake is found almost exclusively in the palm groves edging the rivers. It does not appear to acquire its pure black coloration until over 4 feet in length.

It is a swiftly moving creature, climbing palm trees with ease and biting with accuracy and animus when handled.

I have found lizard remains in the stomach of one; the usual diet however is certainly snakes. Near Bagdad, the only place where I had the opportunity of observing them in any numbers, the victim in the great majority of cases was *Tarbophis iberus*. One specimen kept in captivity for several weeks ate voraciously any small snake offered (usually *Zam. dahlii* or *Zam. ventrimaculatus*) eventually dying as a result of attempting to swallow too large a specimen of the latter. They are thirsty creatures drinking often and copiously from a saucer, occasionally immersing the whole mouth in the process—C. M. I.

6. *Zamenis dahlii*, Fitz.

Bagdad (Capt. Ingoldby).

Habitat: S. E. Europe, Asia Minor, Transcaucasia, N.-W. Persia, Cyprus, Syria.

This most slender and beautiful snake is common in the palm groves, frequenting the young thorny palm bushes where it can feed in reasonable safety. Its food seems to be chiefly insects, occasionally small lizards.

Active in day-time only. All specimens refused food in captivity—C.M.I.

7. *Zamenis ventrimaculatus*, Gray.

Basra, Twin Canals at Sheik Saada, Esra's Tomb between Quarah and Amara (Lt.-Col. Wall); Shaiba (Lt. Livesey); Faleya (Capt. Mackenzie); Zobeya (Capt. Pitman); Bagdad (Capt. Ingoldby); Samash (Maj. Lane); Baquba, N.-E. of Bagdad (E. W. E. Wouterz); Sheik Saad (Sir P. Z. Cox), Basra (Maj. C. Christy).

Habitat: From the Euphrates to Kashmir and N.-W. India.

An active snake, most frequently met with on the desert at considerable distances from water. The colour harmonises perfectly with the baked earth of its surroundings—C.M.I.

8. *Zamenis diadema*, Schlg.

Basra, Bagdad, Twin Canals at Sheik Saad (Lt.-Col. Wall); Shaiba (Lt. Livesey); Faleya (Capt. Mackenzie); Zobeya (Capt. Pitman); Nasiryah (Lt. Livesey); Baquba (E. W. E. Wouterz); Daur (Capt. W. M. Logan Home).

Habitat: From the Sahara and Arabia to Kashmir and N. W. India.

Very common throughout at any rate lower Mesopotamia. The markings of the young persist in adult life—C.M.I.

9. *Lytorhynchus diadema*, D. and B.

Shaiba (Lt. Livesey); Faleya (Capt. Mackenzie); Awaz (Capt. E. S. Hearn).

Habitat: From the Algerian Sahara to Arabia, Syria and Persia.

10. *Contia collaris*, Mén.

Bagdad (Lt.-Col. Wall).

Habitat: Caucasus, Mesopotamia, Persia. A specimen from Muscat is preserved in the Collection of the Bombay Natural History Society. I now regard *C. modesta*, Mart. with the scales in 17 rows, as a distinct species.

11. *Contia coronella*, Schlg.

Shaiba, Zobeya (Lt. Livesey); Faleya (Capt. Mackenzie).

Habitat: Was known from Syria and S. W. Persia.

12. *Tarbophis iberus*, Eichw.

Bagdad (Capt. Ingoldby); Mesopotamia (Capt. Mackenzie).

The 6 specimens in the collection have the scales in 21 rows, as in Wall's *T. tessellatus* (J. Bomb. N. H. Soc. XVIII, 1908, p. 802) from S. W. Persia, of which I have examined the type and which I cannot separate from *T. iberus**

Habitat: Caucasus, Mesopotamia, S. W. Persia.

Moves chiefly by night. Usually extremely sluggish and placid, allowing itself to be picked up and handled without protest. One which I had kept in a small box for two days before transfer to a cage was on removal exceedingly aggressive, hissing and biting vigorously. The largest I found was coiled in a bunch of dates, at midday, on the top of a tall palm.—C.M.I.

13. *Cœlopeltis monspessulana*, Herm.

Bagdad (Lt.-Col. Wall, Capt. Ingoldby).

Habitat: Borders of the Mediterranean, eastwards to the Caucasus and Persia.

Fairly common near Bagdad whenever vegetation is fairly dense.

Lives in holes, usually at the roots of bushes or palms. Most active at night, but not infrequently seen moving in the shade by day, during the great heat. Markings pretty constant, ground colour varying from bluish gray to dark olive brown in specimens of equal size—C.M.I.

14. *Cœlopeltis moilensis*, Reuss.

Sodom, Sheik Saad (Capt. Ingoldby); Shaiba (Lt. Livesey).

Habitat: Northern Sahara, from Algeria to Egypt and Nubia, Arabia, Western Persia.

One specimen sent me by Capt. Cheesman from Sodom near Sheikh Saad. The skin between the dorsal scales is orange or bright brick-red colour. On being disturbed the creature dilates its neck somewhat, producing a striking appearance of a vivid flush as if the neck were aglow—C.M.I.

15. *Psammophis schokari*, Forsk.

Basra (Lt.-Col. Wall); Shaiba (Lt. Livesey).

Habitat: Borders of the Sahara, Arabia, Syria, Persia, Baluchistan, Afghanistan, Sind.

16. *Naia morgani*, Mocquard.

Shaiba (Lt. Livesey); Mesopotamia (Capt. Mackenzie).

Habitat: Previously known from Persia.

When Wall's description of *Atractaspis wilsoni* appeared in this Journal (XVIII, 1908, p. 804, fig.), I concluded that his snake was identical with Mocqard's *Naia morgani* (Bull. Mus. Paris, 1905, p. 78), and I entered it in my notes as a synonym of that species, a conclusion fully confirmed by a comparison with Wall's type specimen kindly entrusted to me by Mr. Kinnear. *Naia morgani* is well characterized by its larger rostral, the internasals separated from the præfrontals, the parietals bordered on the outer side by 3 or 4 temporals, and the entire anal. The Mesopotamian specimens have 23 scales across the neck and 21 across the body. Uniform blackish brown, a little paler beneath.

Wall's *Melanoseps macphersoni* (Journ. Bomb. N. H. Soc. XVII, 1906, p. 27, fig.), from the Aden Hinterland, is a synonym of my *Atractaspis andersonii* (Ann. and Mag. N. H. XVI, 1905, p. 180).

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* *Typhlops wilsoni*, described as new in the same paper, is, in my opinion, a synonym of *T. vermicularis*, Merr.

VIPERIDÆ.

17. *Vipera lebetina*, L.

Bagdad (Lt.-Col. Wall); Aushuru (Lt.-Col. H. D. Piele).

Habitat: Morocco, Algeria, Tunisia, Cyclades, Cyprus, and South Western Asia from Syria and Asia Minor to Baluchistan, Afghanistan and Kashmir.

18. *Cerastes cornutus*, L.

Basra (Lt.-Col. Wall); Shaiba (Lt. Livesey).

All the specimens, six in number, lack the horn-like scale above the eye whence the species derives its name and which is more frequently present than absent in North African individuals.

Habitat: Borders of the Sahara, Arabia and Palestine. Had not been previously recorded from Mesopotamia.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 20, 1920.]

A LIST OF LIZARDS FROM MESOPOTAMIA.

COLLECTED BY MEMBERS OF THE MESOPOTAMIAN EXPEDITIONARY FORCE, 1915 TO 1919.

BY

G. A. BOULENGER, LL.D., D.SC., F.R.S.

The following is an enumeration of the Lizards sent to the Bombay Natural History Society's Museum during the Mesopotamia Expedition which Mr. Kinnear has entrusted to me for identification. I have also referred to the specimens presented to the British Museum by Capt. P. A. Buxton, Major C. Christy, and Capt. C. L. Boulenger :—

GECKONIDÆ.

1. *Ceramodactylus doriæ*, Blanf.
Zobeya, Lower Mesopotamia (Capt. F. C. Fraser).
Habitat : Arabia, Mesopotamia, Persia.

2. *Gymnodactylus scaber*, Rüpp.
Amara (Capt. P. A. Buxton), Basra (Lt.-Col. F. Wall).
Habitat : Egypt, Arabia, Mesopotamia, Persia, Afghanistan, Sind.

3. *Hemidactylus flaviridis*, Rüpp. (*coctæi*, D. and B.)
Basra (Lt.-Col. F. Wall, Lt.-Col. F. P. Connor).
Habitat : Coasts of the Red Sea and of the Persian Gulf, Socotra, Mekran Coast, India, Burma.

EUBLEPHARIDÆ.

4. *Eublepharis macularius*, Blyth.
Mesopotamia (Capt. H. T. Mackenzie).
Habitat : Mesopotamia, Persia, Transcaucasia, Baluchistan, Punjab, Sind.

AGAMIDÆ.

5. *Agama persica*, Blanf.
Euphrates Barrage (Capt. C. R. Pitman), Faleya, Euphrates (Capt. F. W. Mackenzie), Bagdad (Capt. R. W. Hingston), Amara (Lt.-Col. F. P. Connor), Zobeya (Capt. F. C. Fraser).
Habitat : Mesopotamia, Persia.

6. *Agama ruderata*, Oliv.

Faleya (Capt. H. L. Mackenzie), Amara (Lt.-Col. F. P. Connor), Zobeya (Capt. F. C. Fraser, Lt. T. R. Livesey), Basra (Lt.-Col. F. P. Dickinson, Maj. E. H. Martin).
Habitat : Asia Minor, Syria, Arabia, Mesopotamia, Persia, Sind. Also Egypt and Nubia. *A. pallida*, Reuss, should be regarded as a variety of this species, as some of the specimens from Mesopotamia tend to show.

7. *Agama nupta*, De Fil.
Mesopotamia (Capt. H. T. Mackenzie).
Habitat: Mesopotamia, Persia, Baluchistan.

8. *Phrynocephalus maculatus*, Anders.
Zobeya (Capt. F. C. Fraser).
Habitat : Mesopotamia, Persia, Baluchistan, Afghanistan.

9. *Uromastix microlepis*, Blanf.
Zobeya (Lt. T. R. Livesey), Mesopotamia (Lt.-Col. F. P. Connor).
Habitat : Head of the Persian Gulf.

VARANIDÆ.

10. *Varanus griseus*, Daud.
Nasariyeh (Capt. C. R. Pitman), Mesopotamia (Lt.-Col. F. P. Connor).
Habitat : North Africa, South-Western Asia from Arabia and the Caspian Sea to North-Western India.

AMPHISBÆNIDÆ.

21. *Pachycalamus zarudnyi*, Nik.
Shaiba Lezait (Lt. T. R. Livesey).
Originally described from Western Persia, under the name of *Diplometopon zarudnyi*, Nikolsky, Ann. Mus. Zool. St. Petersb. X. 1906, p. 68. A specimen from the Island of Manama, Persian Gulf, was presented to the British Museum by Dr. G. K. Monami in 1910.

LACERTIDÆ.

12. *Acanthodactylus boskianus*, Daud.
Var. *asper*, Aud.
Basra (Maj. C. Christy).
Var. *euphraticus*, Blgr.
Ramadieh, Euphrates (Capt. C. L. Boulenger).
An interesting new form, described by me in the Annals and Magazine, Nat. Hist. (9) iii. 1919, p. 549.
Habitat : North Africa, Arabia, Syria. Had not been recorded from Mesopotamia before.

13. *Acanthodactylus scutellatus*, Aud.
Basra (Maj. C. Christy).
Habitat : North Africa, Senegambia, Arabia, Syria. First record for Mesopotamia.

14. *Acanthodactylus fraseri*, Blgr.
A new species, discovered by Capt. F. C. Fraser at Zobeya and described in this Journal, XXV, 1918, p. 373.

15. *Eremias brevirostris*, Bland.
Faleya (Capt. F. W. Mackenzie), Zobeya (Lt. T. R. Livesey), Ramadieh and Desert of Tel Jebarrah (Capt. C. L. Boulenger).
The types of this species are from Karabagh in the Punjab and Tum Island in the Persian Gulf. The lizard has since been found in Persia near Bushire and in Syria (*E. bernoullii*, Schenkel), and I refer to the same species one of the specimens from Dasht in Baluchistan included by Blanford under his *Mesalina pardalis*.

16. *Ophiops elegans*, Men.
Var. *ehrenbergii*, Wiegm.
Ramadieh, Euphrates, (Capt. C. L. Boulenger).
Var. *persicus*, Blgr.
Sharoban, N.-E. of Bagdad (Capt. C. L. Boulenger).
Var. *mizolepis*, Stol.
Euphrates at Suk esh Shuyak and on road from Felujah to Ramadieh (Capt. C. L. Boulenger).
Amara (Capt. P. A. Buxton), Basra (Lt.-Col. F. Wall).
The range of this lizard extends from Constantinople and Tripoli to N.-W. India. The var. *mizolepis* was originally described from the low country S.-W. of Karabagh, on the Indus, and was found at Basra by Blanford; specimens from Haifa in also Palesting appear to be referable to it.

SCINCIDÆ.

17. *Mabuia vittata*, Oliv.

Amara (Capt. P. A. Buxton), Mesopotamia (Capt. C. R. Pitman).

Habitat: Algeria, Tunisia, Lower Egypt, Syria, Cyprus, Asia Minor, Mesopotamia.

18. *Mubuia septemtæniata*, Reuss.

Amara (Lt.-Col. Connor, Capt. P. A. Buxton), Basra (Lt.-Col. F. Wall, Lt.-Col. F. P. Connor), Ramadieh, Euphrates (Capt. C. L. Boulenger).

Habitat: Erytrea, Arabia, Syria, Asia Minor, Transcaspia, Mesopotamia, Persia, Sind.

19. *Ablepharus brandti*, Strauch.

Amara (Capt. P. A. Buxton), Basra and Suks-esh-Shuyek, Euphrates (Capt. Boulenger).

Habitat: Bokhara, Samarkand, Mesopotamia, Persia, Baluchistan, Punjab, Sind.

20. *Eumeces schneideri*, Daud.

Mesopotamia (Capt. H. T. Mackenzie).

Habitat: Tunisia, Egypt, Syria, Cyprus, Asia Minor, Transcaspia, Mesopotamia, Persia, Baluchistan.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, MAR. 31, 1931.]

REPORT ON A COLLECTION OF MAMMALS MADE BY COL. J. E. B. HOTSON IN SHIRAZ, PERSIA.

BY

MAJ. R. E. CHEESMAN, M.B.O.U., F.R.G.S.

The date of this collection is February 10th to August 15th, 1919.

A short notice of a subsequent Shiraz collection from Colonel Hotson, including a description of a New Vole by Mr. Oldfield Thomas, will be found at the end of this paper.

The mammals inhabiting Shiraz and the immediate neighbourhood are of exceptional interest, especially so at the present moment, as they form a link between two recently acquired collections, from the East and West, that from Baluchistan by Hotson and that from Mesopotamia by the Mesopotamian Expeditionary Force.

I have had great pleasure in working out this collection. Mr. Oldfield Thomas and Mr. R. C. Wroughton have given me every assistance in the unravelling of the various problems. The paucity of different species to be found in one place is experienced by all who have collected in Persia and Mesopotamia and even the dense forest region between the Elburz Mountains and the Caspian has proved no exception. Not only are the animals scarce, but they are difficult to trap, being usually untempted by ordinary baits.

Of the 13 species obtained, two of the bats have proved new and have been given subspecific rank :—*Myotis myotis risorius* and *Rhinolophus ferrum-equinum irani*. In each case they are well marked pale desert forms, their colour resembling the dove grey of the Indian ring dove, *Turtur risorius*, after which the *Myotis* is named.

The altitude is the same for nearly all the specimens, when the elevation is not given, it is that of Shiraz, 5,200 feet.

Very little previous collection in Shiraz has been undertaken. In1862 De Filippi obtained from the Marquis Doria a few specimens from Shiraz which he mentions in "Viaggio in Persia" although he personally travelled only in Northern Persia, around Kazvin and Teheran and the Caspian region.

In 1871 Dobson wrote a paper on a few specimens of animals which had been obtained in Shiraz.

In 1872 Dr. Blandford and Major St. John passed through Shiraz and made collections the results of which are recorded in "Eastern Persia," written by the former.

Since then our knowledge of the mammals has increased by only one small addition, made by Mr. H. F. Witherby in 1902 during an expedition which reached Shiraz, but was mainly occupied with ornithology.

Colonel A. C. Bailward, with Mr. R. B. Woosnam, in 1905, secured many specimens in adjacent country between Ahwaz and Ispahan on their journey to Armenia, but they kept well to the north of Shiraz (P. Z. S., 1905, p. 519, Thomas). A subsequent journey in 1907 was confined to the district between the South Coast of the Caspian and Teheran (A. M. N. H. 7, xx, p. 196, Thomas). As these somewhat scattered references have come under review during the writing of this paper, the various Shiraz species mentioned in them have been included, for the sake of concentration, so that this paper and Blanford's "Eastern Persia," Vol. II, should comprise the complete list up to date.

The present nomenclature is used, the original names when different are given in brackets.

DE FILIPPI, VIAGGIO IN PERSIA, 1862, p. 342.

Meriones tamaricinus, Pall. Shiraz by Marquis Doria.
Probably *Meriones persicus* or *Meriones ambrosius.*
Apodemus sylvaticus (*Mus. sylvaticus.*)
Probably : *Apodemus sylvaticus witherbyi.*

DOBSON, JOURN., AS. SOC. xl, p. 455, 1871.

Triœnops persicus, Dobson, a Bat belonging to the *Rhinolophidæ*, with a remarkable complex noseleaf, of large size, with three pointed projections on the upper edge.

Eptecicus shiraziensis, Dobson (*Vesperus shiraziensis*), the Shiraz Serotine Bat.

Pipistrellus kuhli lepidus, Blyth (*Pipistrellus marginatus*), Kandahar Pipistrel, a subspecies of the White bordered bat.

Pipistrellus coromandra, Grey (*Pipistrellus coromandelicus*), Coromandra Pipistrel.

Myotis myotis (*Vespertilio murinus*), Mouse-Eared Bat.
Probably *Myotis myotis risorius.*

COLLECTED BY H. F. WITHERBY, 1902.

Some of these species were dealt with by Thomas in the Report "Mammals from Persia and Armenia presented to the British Museum by Col. Bailward." P. Z. S., 1905, Vol. ii, and Witherby's Field-mouse was described by Thomas in A.M.N.H 7, X, 1902. They have not been published previously as a complete list.

Eptesicus mirza, De Filippi, (*Vespertilio*), the Mirza Serotine.

1 ♀ Basht, Shulistan, alt. 4,000′; 1 ♀ Telespid, Shulistan, 3,200′.

Witherby remarks: "shot flying about at sunset in rocky places with trees." Woosnam also obtained this bat at Mal Amir, alt. 4,300′, and says "shot among oak trees on hill-side. They hang up during the day in the old trees."

Pipistrellus kuhli, Kuhl, White-bordered Bat.

1 ♀ Shiraz, Fars; 1 ? Kamarij Dashtistan.

Myotis myotis omari, Thomas, Omar's Mouse-eared Bat.

1 ♀ Telespid, Shulistan.

Rhinopoma microphyllum, Geoff, Egyptian Mouse-tail.

1 ♀ Telespid, Shulistan.

Nearly the whole of the long tail projects beyond the filament.

Length of tail 60mm. *R. kinneari*, Wroughton, a slightly larger species has been found in Sind and *R. pusillum*, Thomas, a small species has been lately described from S. E. Persia.

Vulpes persica, Blanf, Persian Desert Fox.

1, also 1 skin and 1 skull.

Blanford described the type from specimens obtained in the hills near Shiraz, alt. 6,000'.

Sciurus fulvus, Blanford. Fulvous Squirrel.

1 Kaluni, Fars, 4,200'; 1 ♂, 1 ♀ Sisakht, Fars, 6,500'; 1 Chinar, 6,600'.

The type locality is oak forests round Shiraz. Witherby remarks "found in wooded valley in a species of evergreen oak; often running on ground." Probably a sub-species of *persicus*.

Apodemus sylvaticus witherbyi (*Mus.* (also *Micromys*) *sylvaticus witherbyi*), Thomas, Witherby's Field-mouse.

1 ♂ Shul, Fars, 5,200'.

Lepus lehmanni, Severz., the Turkistan Mountain Hare.

3 ♂, 1 ♀ Dasht-i-arjan, 6,400'.

Closely assimilates to specimens of *L. lehmanni* obtained by Carruthers in the Hissar Mountains, Turkistan. They are considerably larger than *L. connori*, Rob., from the Mesopotamian Plain, though in colouring there is a certain similarity, also larger than *L. craspedotis*, the Baluch Hare.

THE FOLLOWING IS A LIST OF COL. HOTSON'S SPECIMENS:—

1. RHINOLOPHUS FERRUM-EQUINUM IRANI, Subsp-nov.

Persian Horse-Shoe Bat.

1. ♀ (type); 8 immature.

A pale desert form of *R. ferrum-equinum*, the horse-shoe bat of Europe. Specimens from Asia Minor are identical with the European form. The present series has been compared with these and with *R. f.-e. tragatus* from North India. The Shiraz bat is paler in colour and slightly longer in the forearm than either of these forms. In the National Collection an unnamed specimen of this pale form from *Turbat-i-Haidari*, N. E. Persia, obtained by Watson, was awaiting further material for identification. This extends the known range across Persia and has suggested the name *irani*.

Size medium; hairs of the back soft and long (9mm).

General colour above pale "fawn colour", bases of the hairs pale "drab", darkening to pale fawn colour at the tip. Underparts pale drab with a washing of "vinaceous buff".

Measurements of the type: head and body (in flesh), 60mm; tail, 44; hindfoot, 12; ear, 25. Forearm, 60 mm.

Skull:—Greatest length, 23·5 mm.; basilar length, 16; greatest breadth, 12·5; least interorbital breadth, 3; breadth of braincase, 9·5; upper tooth row, including canine, 9.

Hab: Persia. Type from Shiraz, alt. 5,200′.

Type: —Adult, ♀ B. M. No. 20. 2. 9. 3. Original number 920. Collected 21st June 1919 by Col. J. E. B. Hotson and presented by the Bombay Natural History Society to the British Museum.

The eight immature specimens are a paler shade of the same general colour as the adult.

The nose-leaf from dry skin measured 12mm. by 7·5.

2. PIPISTRELLUS KUHLI LEPIDUS, Blyth.

Kandahar Pipistrel.

1845. *Pipistrellus lepidus*, Blyth, J. A. S. B., xiv, p. 340.

14 ♀.

The forearm of these measures 33-34mm.

The large proportion of females to males in collections of Pipistrels is remarkable. Buxton obtained one male to sixteen females in a series of *P. kuhli* in Amara.

3. PIPISTRELLUS MIMUS GLAUCILLUS, Wroughton.

Northern Dwarf Pipistrel.

1912. *Pipistrellus mimus glaucillus*, Wroughton, J. B. N. H. S., xxi., p. 769. ♂12; ♀81; in al. 6.

Ten from Bagh Mizathahami, Shiraz, the rest from Shiraz.

The forearm of these is about 31mm.

P. mimus is generally distributed throughout India and is smaller and darker than *P. kuhli*, *P. m. glaucillus* is a paler slightly larger sub-species. The type locality is Multan, Punjab; it also occurs in Sind.

4. MYOTIS MYOTIS RISORIUS, Subsp. nov.

The Dove-grey Mouse-eared Bat.

♂3; ♀1.

Much resembles, but is paler than *Myotis m. omari*, Thomas. Also differs from *M. M. omari* in the absence of the general washing of cream buff on the back, underparts, and wing filaments, which on the back of *M. m. risorius* is replaced by a pale purplish washing. In the underparts the creamy buff tips to the hairs in *M. m. omari* are in these specimens white, giving to the belly a much whiter appearance. Forearm measurements are on an average slightly longer than those of *M. m. omari*.

Considerably paler and slightly longer in the forearm than either *M. myotis* from Europe or *M. blythi* from North India.

Size large, hairs on the back soft, and long (10mm).

General colour above "drab grey", slightly darker towards the tail, bases of hairs "slate colour", tips pale purplish. Below bases of hairs "clove brown", tips of hairs white, clove brown of bases faintly showing through the white tips. Limbs and wing filaments "drab". Line of demarcation of colour upper and underparts clearly defined.

Measurements of the type: forearm 62mm.; head and body (in flesh) 76mm. tail, 62; hindfoot, 14; ear, 26.

Skull: greatest length, 24mm; basilar length, 18·5; greatest breadth (broken) 14·5: interorbital breadth, 5·5; breadth of brain-case, 10; upper tooth row, including canine, 9.

Hab.—Persia. Type from Shiraz, alt. 5,200′, three more specimens from the same locality.

Type.—Adult ♂ B. M. No. 20-2-9-18. Original number 925. Collected 22nd June 1919, by Col. J. E. B. Hotson and presented by the Bombay Natural History Society to the British Museum. The neighbouring subspecies *M. m. omari has* been obtained at Derhend, North of Isphan, alt. 6,500′, the type locality. Also at Resht at 400′ by Woosnam and at Telespid, S. W. Persia, alt. 3,200′ by Witherby.

5. HERPESTES EDWARDSI FERRUGINEUS, Blanford.

Ferrugincus Indian Mungoose.

1874. *Herpestes ferrugineus*, Blanford, P. Z. S., p. 661.

♂ 1.

This is a rufous race of the Indian Mungoose, *Herpestes edwardsi*, Geoffroy. A specimen from Qasrqand, Persian Baluchistan, (Hotson) is a well marked example of this rufous form.

Shiraz is at present the Western limit of its range, the type locality is Sind.

The better known name for the Indian Mungoose, *Mungos mungo*, really belongs to a South African species of Banded Mungoose. This has been recently pointed out by Dr. J. A. Allen of New York and accepted by Mr. Oldfield Thomas. It has therefore been necessary to revive the earliest generic and specific name available for the Indian Mungoose which is *Herpestes edwardsi.*

6. CANIS AUREUS, L.

Jackal.

1756. *Canis aureus*, Linnæus, Syst. Nat. i. (10th ed.) p. 40.

♂ 1; ♂ immature 1.

The adult is in summer coat, which is much worn. Shows a marked similarity in colour shades and skull, characters and size to specimens from the Lower Tigris.

7. MERIONES PERSICUS, Blanford.

The Persian Jird or *Gerbil.*

Ann & Mag. Nat. Hist.., xvi, 1875, p. 312.

1876. *Gerbillus persicus*, Blanford. East Persia. ii. p. 66.

♂ 1; ♀ 2.

These agree with all the specimens of *M. persicus* in the British Museum. Shiraz is also close to the type locality.

In recent collections this species has been obtained at Mal-a-Mir, N. E. of Awaz (Woosnam) and from several districts in Baluchistan (Hotson).

8. MERIONES AMBROSIUS, Thomas.

Cinnamon-buff Jird or *Gerbil.*

1919. *Meriones ambrosius*, Thomas, A. M. N. H., 9, iii, p. 270.

♀ 2; ♀ 2 immature.

The two adult specimens show a marked resemblance to the type of *M. ambrosius.* The two immature skins have been placed with them. The pelage is not so highly coloured as in the adult, but shows a closer affinity to *M. ambrosius* than to *M. persicus*, the only two representatives of the genus in this collection.

M. ambrosius is a very beautiful species of the larger gerbils, the bright cinnamon buff colouring readily distinguishing it from the more sombre *M. persicus* and *M. erythrourus.* Three of the Shiraz specimens have a few white hairs at the end of the tail forming a small white tip although this is apparently not a constant feature.

9. Mus bactrianus, Blyth.

The Kandahar House Mouse.

1846. *Mus bactrianus*, Blyth, J. A. S. B., xv, p. 140.

♂ 75 ; ♀ 74.

It is not surprising that the series of mice from Shiraz should show a very mixed breed, owing to the fact that it is situated at a point where several races meet. Stowaways on caravans have doubtless alighted to add to the confusion. To the North we have received typical examples of the dark bellied European form *M. musculus* from Buxton at Kasvin. The majority of those obtained in Mesopotamia by the Mesopotamian Expeditionary Force, were *M. m. gentilis*, with whitish belly, the bases of the hairs being slaty. To the East the white bellied *bactrianus* was taken by Hotson in Baluchistan.

The Shiraz mice have a tail averaging 10mm. longer than the Mesopotamian series, I have therefore referred those under review provisionally to *M. bactrianus* although the colour of the underparts in the specimens grades from this type to that of *M. m. musculus*.

10. Cricetulus migratorius, Pallas.

The Little Grey Hamster.

1794. *Mus migratorius*, Pallas, Reis, ii, p. 703.

♂ 26 ; ♀ ; 24 in al. 1.

Notwithstanding this very fine series of Shiraz hamsters to work with, I have been unable to distinguish any constant differences between this and *C. migratorius*. The sizes certainly vary within considerable limits. The females are larger than the males on an average. Of the nine skins in which the head and body measurements taken in the flesh were 100mm. or over, six were females.

Many of both sexes have the ochraceous tint of colouring in contrast to the usual blue grey. One skull was sent with the two cheek pouches attached, well distended with grains of barley. This abnormal development in the hamster is used for conveying corn, from the field to the burrow where it is stored.

11. Ovis vignei cycloceros, Hutton.

The Afghan Urial.

1842. *Ovis cycloceros*, Hutton, Calc. Journ., Nat. Hist., p. 88.

♂ 1 ; ♀ 1 ; Dehnau, 12 miles S. E. of Shiraz, alt. 5,500′.

Adult male with typical horns of the *ovis vignei* group, the tip curving towards the front of the eye. Horn measurement, round the front curve 24 inches. Shoulder of male taken in the flesh, 30·5 inches. Horn of adult female measured 3·5 inches round front curve. Shoulder taken in the flesh 25·5 inches.

12. Capra aegagrus blythi, Lydekker.

Sind Wild Goat.

1898. *Capra hircus blythi*, Lydekker, Wild Oxen, Sheep and Goats, p. 264.

♀ 1 ; Siakh Range, 10 miles S. of Shiraz.

This is a slightly smaller race of the Persian Wild Goat, *Capra ægagrus*, Gmelin, with slighter development of the knobs on the front edge of the horns and has a range in Sind, Baluchistan, and South Persia. *Capra ægagrus* reaches Asia Minor, the type locality is Daghestan district of the Caucasus and it appears to replace *C. æ. blythi* in the Elburz Mountains.

13. GAZELLA SUBGUTTUROSA, Guldenstadt.

Persian Gazelle.

1778. *Antelope subgutturosa*, Guldenstadt, Acta. Ac. Sci., Petrop, p. 251.

♀ 1; Low hills between Khan-i-Zinian and Shiraz, alt. 5,600.′

An adult female without horns, shot in June and is in the summer coat. The mask has the forehead nearly white, a broad pale chestnut stripe runs from the forehead down the centre of the face, ending in a small dark brown patch above the nose, two almost white stripes run parallel on each side of this central stripe and again two more pale chestnut stripes commence in front of the eye and terminate to the side of the nose. There is a male of this species mounted in the British Museum which has the face all white. This is at once a most interesting and valuable addition to the representatives of the Gazelle family in the National Collection, a group in which the material is sadly deficient, more particularly in the case of adult females on which many of the species of Gazelle are largely based.

The Persian Gazelle is a comparatively long coated species, with hornless females, that inhabits the higher ranges of hills and plateaux. This skull is considerably larger than any other with which comparison was made.

Hotson gives the measurement of the shoulder, taken in the flesh, as 26·5 inches, which is one inch more than the female Urial he sent from the same locality.

The type locality is given by Lydekker as Persia, at elevations of 3,000′ to 7,000′, and he includes Afghanistan in the range. Westward the species would meet *Gazella marica*, Thomas, which reaches the valley of the lower Karun River, a male and horned female having been obtained at Shushter by Bailey and mentioned in the report on the mammals collected by the Mesopotamian Expeditionary Force.

SUPPLEMENT.

Since the proofs of the first paper have been returned from the printer for correction, another small collection has arrived from Col. Hotson, including a new vole. There has been just time to attach the description of this vole by Mr. Oldfield Thomas and a short notice of the other species to my original paper for publication together.

Among those who contributed towards the Shiraz Collection, Col. Hotson writes that he received valued help from Lieut. J. T. Garrett, 15th Lancers, Lieut. B. L. Herdon and Major A. E. W. Lake, both of the 1/127th Q. M. O. B. L. I., Lieut.-Col. H. R. B. Gibson, I.M S., Capt. R. Blandy, South Persian Rifles and Officers of the 36th Indian Mountain Battery. The date of this supplementary collection is August 15th to December the 16th, 1919.

THE DETAILED LIST OF THE SPECIES IS AS FOLLOWS:—

1. PIPISTRELLUS MIMUS GLAUCILLUS, Wroughton.

♂ 7; ♀ 11. Ten from Bagh-i-Jaffarani, Shiraz, the rest from Shiraz. Notes as in my paper.

2. PARAECHINUS MACRACANTHUS, Blanford.

Baluch Hedgehog.

1876. *Erinaceus macracanthus*, Blanford, East Persia, ii., p. 27.

♂ 1. Bagh-i-Rezi, Shiraz.

Type locality Dizak, Baluchistan. It was also obtained by Blanford at Karman. A plate of this Hedgehog is given in Eastern Persia, ii. Both the base and the tip of the spines, as well as the underfur, is dark brown,

almost black. The head, ears, and chest are grizzled by an admixture of white hairs. Blanford found that albinism was prevalent in the species.

3. CANIS AUREUS, L.

♂ 1. Bagh-i-Gulshan, Shiraz. Alt. 5,000′.

A typical example of *Canis aureus* in full winter coat. The general colour of the back is pale fawn, almost silvery, to which the black tips to the hairs give a grizzled appearance; the ears and hind legs are bright fawn, inclining to rufous the fore-legs are fawn coloured. Throat and belly white, chest washed with fawn. *See* my paper above.

4. VULPES, *sp.*

♂ I. Purchased.

This is a very dark specimen of a fox about the size of *V. persica*, with a large amount of purplish black on the under parts and back; the ears are entirely black outside and light fawn inside. Unfortunately it is a trade skin, without skull, and the classification cannot be carried further until more material is available. This skin was obtained from a dealer by Lieut.-Col. W. A. K. Fraser, D.S.O., M.C., South Persian Rifles.

5. TATERA PERSICA, Wroughton.

The Seistan Gerbil.

1906. *Tatera persica*, Wroughton, A. M. N. H., 7, xvii., p. 496.

♀ 1. imm., Akbarabad, near Shiraz. Alt. 4,800.

6. MERIONES AMBROSIUS, Thomas.

♂ 1, ♀ 1. One from Bagh-i-Jaffarani, Shiraz.

See my paper above.

7. MUS BACTRIANUS, Blyth.

♂ 88, ♀ 83.

The remarks on the House mice in my original paper apply equally to these except that the white-bellied specimens typical of *Mus bactrianus* are here in larger proportion.

8. CRICETULUS MIGRATORIUS, Pallas.

♂ 5, ♀ 27.

See my paper above.

9. CALOMYSCUS BAILWARDI, Thomas.

Bailward's Vesper Mouse.

1905. *Calomyscus bailwardi*, Thomas, P. Z. S., ii., p. 524.

♂ 2.

The type locality of this species is Mal Amir, 70 miles N. E. of Ahwaz. Thomas has given this descriptive paragraph which I borrow in full "A beautiful gerbil-coloured, long eared, tufted tailed mouse, of about the size of *Mus musculus*." Woosnam who collected the type says it was "trapped among barren rocks on mountain side above the Mal-i-Mir marsh." Hotson says "trapped on the hills 2 miles from Shiraz, Alt. 5,200′."

Two allied species were obtained in Baluchistan by Hotson.

10. MICROTUS IRANI, Thomas.

Shiraz Vole.

♂ 5, ♀ 1. Bagh-i-Rezi, Shiraz.

The following is Mr. Oldfield Thomas' description of this new Vole:—

"*Microtus irani*, sp. n.

"A rather large buffy coloured species, with a striking external "resemblance to *M.* (*Phaiomys*) *afghanus*, Thos., but with normal "*Microtus* dentition.

"External appearance almost exactly as in *afghanus*. General "colour above sandy buff, nearest to 'tawny olive', the hairs slaty at "base with buffy subterminal rings and dark brown extreme tips. "Sides clearer sandy. Under surface soiled whitish or creamy, the "hairs slaty at base, except on the chin. Hands and feet creamy "white. Tail sandy above, white on sides and below. Hindfoot pads "apparently five in number and mammæ 2—2=8, but neither are "absolutely clear.

"Skull large and strongly built, twice the size of that of *M. mysta-* "*cinus*, the zygomata stout and widely expanded. Palatal foramina "narrow, reaching back just to the level of the front root of m^1. "Posterior palate with well marked lateral pits. Bullæ large, though "rather smaller than in *afghanus*.

"Molar pattern as in typical *Microtus*; m^3 with four completely "closed triangles and a posterior C, there thus being four salient "angles on each side. In *afghanus* there are only three. M^2 in the "type with a small additional internal projection approaching that of "*M. agrestis*, but this absent in other specimens. M^1 with six closed "triangles and a well developed anterior trefoil. In *afghanus* there "are only four closed triangles.

"Dimensions of the type, as measured by the Collector:—

"Head and body 107 mm.; tail 37; hindfoot 19; ear 13.

"Skull:—Condylobasal length 30; condylo-incisive length 30·5; "zygomatic breadth 18·2; nasals 7·5; intertemporal breadth 4; mastoid "breadth 14·3; height of crown above bullæ 11; palatilar length 15·2; "palatal foramina 6·1; horizontal diagonal diameter of bullæ 8·7; "upper molar series 6·7.

"*Hab.*:—Bagh-i-Rezi, Shiraz. Alt. 5,200′.

"*Type*:—Old male, B. M. No. 20. 5. 20. 9. Original No. 1328. "Collected 17th September 1919. Six specimens examined.

"This striking and most distinct vole is quite unlike any described "species except for its marked but purely superficial resemblance to "*M.* (*Phaiomys*) *afghanus*. Geographically also it is very isolated, as "its nearest neighbour is the North Persian *M. mystacinus*, Filippi, "which is barely half its size. A co-type of the latter, acquired by "exchange from the Turin Museum is now in the British Museum."

11. Ovis vignei cycloceros, Hutton.

♂ 1, ♀ 1.

The male from Baiza, 35 miles N. N. E. of Shiraz, shoulder measurement taken in the flesh 32 inches; horn measured round front curve 28 inches. Adult female from Kuh-i-Bamu, 8 miles N. of Shiraz. Alt. 8,000′. Height at shoulder in flesh 28·5 inches, horn 1·25 inches. *See* original paper above.

12. Capra ægagrus blythi, Lydekker.

♀ 2. One from Kalat, 30 miles N. W. of Shiraz, alt. 6,500′, shoulder measured in flesh 29·5 inches, horn measured round front curve 8 inches; the other from hills above Kavar Valley, S. E. of Shiraz, shoulder measured in flesh 24·5 inches. *See* original paper above.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, MAR. 31, 1921.]

THE ARABIAN OSTRICH.

BY

S. H. PRATER.

In March 1920 Col. Sir Arthur Wilson, then Acting Civil Commissioner of Mesopotamia, presented the Society with the skin of an ostrich which was given to him by a Chief of the Anaizah Tribe in Central Arabia. Though there are several records existent, the occurrence of ostriches outside African limits is not very generally known. In forwarding the skin, Col. Wilson sent us the following extract from "Burckhardt's notes on Bedouins," Vol. I, which contain several interesting points in connection with these birds.

Burckhardt writes "These (the ostriches) inhabit the great Syrian Desert, "especially the plain extending from Hauran towards the Djebel Shammar and "Nedjd. Some of them are found in Hauran, and a few are taken almost every "year, even within two days' journey of Damascus. The Arabs call the male "ostrich *Zazilhum;* the female *Reidah.* The male has black feathers, with "white ends, except the tail feathers, which are wholly white. But the feathers "of the female are spotted grey. This bird breeds in the middle of winter "and lays from twelve to one and twenty eggs. The nest (*madhah*) is generally "made at the foot of some isolated hill. The eggs are placed close together "in a circle, half buried in sand, toprotect them from rain, and a narrow trench "is drawn round, whereby the water runs off. At ten or twelve feet from this "circle, the female places two or three other eggs which she does not hatch, "but leaves for the young ones to feed upon immediately after they are hatched. "The parent birds sit on the eggs in turn; and while one is so employed, the "other stands keeping watch on the summit of the adjacent hill, which circum-"stances enable the Arabs to kill them. When they descry an ostrich stand-"ing in this manner on a hill, they conclude that some eggs must be near; "the nest is soon found, and the ostriches fly away. The Arab then digs a "hole in the ground near the eggs and puts his loaded gun into it, having fastened "to the lock a long burning match, the gun being pointed towards the eggs; "he covers it with stones and retires. Towards evening the ostriches return, "and not perceiving any enemy, resume their places, generally both at once "upon the eggs; the gun, in due time, is discharged and the Arab finds next "morning one of the ostriches, or frequently both killed upon the spot. Such "is the usual method of killing these birds, for the hunting of them is not prac-"tised in the Northern Arabian Desert. It has been supposed that the sun "alone hatches the ostriches' eggs; but this opinion is proved to be erroneous "by the statement above given, which shows that the ostrich sits during the "rainy season on its eggs, and the young ones are hatched in spring, before "the sun has acquired any considerable degree of heat.

"The inhabitants of the district called Djaf eat the ostriches' flesh, which they "purchase from the Sherarat Arabs. The eggs are sold for about one shilling "each; the Arabs reckon them delicious food. The towns' people hang up "the shells as ornaments in their rooms. Ostrich feathers are sold at Aleppo "and Damascus, principally at the latter city. The people of Aleppo some-"times bring home ostriches which they had killed at the distance of two or "three days' journies eastward. The Sherarat Arabs sell the whole skin "with the feathers on it; such a skin in the year 1810 was sold at Damascus "for about ten Spanish dollars; the skin itself is thrown away as useless. At "Aleppo (in the spring of 1811) the price of ostrich feathers was from 260 "to 600 piastres the rotala (about £2 10s. to £6 per pound). The finest feathers "are sold singly, at from one to two shillings each."

At Col. Sir Arthur Wilson's request, the late Col. Leachman favoured us with the following information in regard to the occurrence of these birds in Arabia. Writing from Anah, on the 16th May 1920, Col. Leachman says "I have been

" requested by the Civil Commissioner to reply direct to your letter to him,
" dated 26th March, in which you ask for information regarding the whereabouts
" of the Ostrich in Northern Arabia.

" According to Arab information the ostrich is found most plentifully abou
" fifty miles south-west of JAUF, about 300 miles East of the gulf of Akaba.

" It is found also to a certain extent North of JAUF at the heads of the wadis
" which drain into Mesopotamia as far North as the Damascus Baghdad direct
" route. I have eaten fresh ostrich egg in the desert 100 miles West of Kerbela ;
" also 200 miles West of Basrah."

" The ostriches are hunted by *Sulaib* (Sing. *Solubi*), a type of nomad, thought
" to be of non-Arabian origin. They live alone in small camps far out in the
" desert throughout the year and have far greater knowledge of water-holes
" than the Bedouins themselves. Their hunters dress in gazelle skins and
" can approach within touch of gazelle and ostriches before firing their rifles.
" Their rifles are for the most part of a very old type, the reason being that
" if they carried modern rifles, the Bedouin would certainly take them away
" from them. Otherwise the Bedouin do not molest them."

" Burton in his " Pilgrimage from Medinah " el Meccah, V. III, p. 70, writes :—
" Ostriches are found in El. Hejaz where the Bedouins shoot after coursing
" them. Throughout Arabia there is a belief that the ostrich throws stones
" at the hunter. The superstition may have arisen from the pebbles being flung
" up behind the bird by the bird's large feet or it may be a foolery of Fancy".

Canon Tristram gives the following interesting account of the methods of hunting the ostrich adopted—by Arabs in North Africa :—

" The capture of the ostrich is the greatest feat of hunting to
" which the Arab Sportsman aspires and in richness of booty it ranks
" next to the plunder of a caravan. But such prizes are not to be obtained
" without cost and toil and it is generally estimated that the capture
" of an ostrich or two must be at the sacrifice of the lives of two horses. So
" wary is the bird and so open are the vast plains over which it roams that
" no ambuscade or artifices can be employed, and the vulgar resource of dogged
" perseverance is the only mode of pursuit. The horses so employed undergo
" a long and painful training, abstinence from water and a diet of dried dates
" being considered the best method for strengthening their wind. The hunters
" set forth with small skins of water strapped under their horses bellies and a
" scanty allowance of food for four or five days distributed judiciously about
" their saddles. The ostrich generally lives in companies of from four
" to six individuals, which do not appear to be of the habit under
" ordinary circumstances of wandering more than 20 or 30 miles from
" their head quarters. When descried two or three hunters follow the
" herd at a gentle gallop, endeavouring only to keep the birds in sight
" without alarming them or driving them at full speed when they would
" soon be lost to view. The rest of the pursuers leisurely proceed in a direc-
" tion at right angles to the course which the ostriches have taken, knowing
" by experience their habits of running in a circle. Posted on the best lookout
" they can find, they await for hours, the anticipated work of the game cal-
" culation upon intersecting their path. If fortunate enough to detect them the
" relay sets upon the now fatigued flock and frequently succeeds in running one
" or two down, though a horse or two falls exhausted in the pursuit. The os-
" trich when overtaken offers no resistance beyond kicking out sideways. A
" skin on the spot is worth from 40—100 Spanish dollars, but the Arabs are in
" the habit of judiciously thinning the feathers so that the trader can rarely
" obtain a specimen on which the tax has not been paid."

The Arabian ostrich has been recently distinguished as a separate race by Lord Rothschild. In connection with the above Mr. N. B. Kinnear sent us the following notes which summarise what has hitherto been recorded of

the distribution of these birds outside African limits. Mr. Kinnear writes:—At a meeting of the British Ornithologists Club in May 1919, Lord Rothschild described as a new race two ostriches, male and female, from the Syrian desert. He gave as the distinguishing characters the "bill though not much shorter is much narrower, while the tarsus and tail are distinctly shorter. They have the same naked shield on the head as in *S. camelus*, but the horny shield as in *molybdophanes*.

The history of these two birds is as follows:—Before the war Mr. J. Aharone in Palestine obtained some ostrich eggs through Arabs from the Syrian desert. These he sent to Lord Rothschild who, seeing that though they agreed with other eggs from North Africa in being smooth and not pitted, they differed in their smaller size and higher polish, wrote at once and urged Mr. Aharone to obtain some adult skins. This Mr. Aharone was not at once able to do, but he obtained through the Arabs two live fully grown young ones which he reared up to maturity in spite of the war in Palestine, and afterwards killed and sent to Lord Rothschild after we had occupied Palestine. As Lord Rothschild pointed out "the fact that ostriches inhabit the Syrian desert and Arabia has been known for a long time—in fact there are several passages in the bible relating to the bird". Cannon Tristram in his "Fauna and Flora of Palestine" states that the ostrich only just claims a place in the Fauna of Palestine by its occurrence in the further parts of Belka, the eastern plains of Moab. It is no doubt but a straggler from central Arabia though formerly far more abundant. Xenophon speaks of its abundance in his time in Syria (Anal ; 1-5) and we have traditional accounts of its former existences in Sind. A portion of an ostrich skin captured at Belka and given to Canon Tristram is in the British Museum.

Later, Mr. Douglas Carruthers writing in the "Ibis" for 1920 mentions that he had observed an ostrich in N. W. Arabia at Wadi Hidrij, a hundred and twenty miles S. E. of the Dead Sea. He also rode up fairly close to some in the black. stone desert called by the Bedouins *Ar-des-suwan* and further S. E. he occasionally saw traces of them and on the edge of the Nafud he found broken eggs. He considers that the Mecca Railway marks the extreme western range of this bird in Arabia and does not think they go North of the 31st paralleled.

W. F. Ainsworth who took part in the Euphrates Expedition of ? notes that "ostriches have long since been exterminated in Mesopotamia" (Personal narative of the Euphrates Expedition).

This briefly is what is known of the ostrich outside Africa in modern times, and though there are various traditions to the contrary it is unlikely that the ostrich was found beyond the desert of Upper Syria and Mesopotamia in historic times.

Before going on to remark on the extinct ostriches in Europe and Asia it may perhaps be as well to note that more than one species and race of the ostrich is found in Africa. In the North we have the typical form *Struthio camelus camelus* formerly inhabiting Egypt and Algeria, now found in Nubia, the Sudan, Sahara to Senigambia, and S. Negiria. In the North-East the Somali ostrich *S. molybdophanes* from Somaliland through Gallaland to the Tanna river; and in British East Africa, Tanganika territory to Uganda, *S. massaicus* the Masai Ostrich. Africa, south of the Zambesi, is inhabited by *S. australis* the bird from which most of the ostrich feathers are obtained. Besides being distinguishable by certain characters of the skin these ostriches can also be separated by their eggs which are all slightly different.

In the Pliocene of the Siwalik hills the fossil remains of an ostrich were discovered many years ago and named by Milne Edwards *Struthio asiaticus* and years later in 1894 Dr. Forsyth Major described a femur and a pelvis of another example from the Lower Pliocene of Mityline in the Island of Samos, calling it *S. karathcodoris*. Besides these fossil bones a number of fossil eggs have been

found from time to time, which are supposed to belong to an extinct ostrich or ostriches. The first came from the district of Cherson, S. Russia and was named by Brandt as belonging to an extinct form, which he called *S. chersonensis.* Another supposed to belong to the same form was found in 1894, 140 miles N. W. of Pekin. The remaining known egg, or rather fragments, was found by the late Mr. Archibald Carlyle, of the Archæological Survey, in a Nullah on the Kain R., Banda district, U. P., and bought by Mr. E. Bidwell at an auction sale in London. These fragments were submitted to Dr. Andrews of the British Museum, who considered them to be " parts of an egg of a species of *Struthio* and that in the distribution of the pores on the surface of the shell they are almost identical with the Somali ostrich *Struthio molybdophanes* although possibly the shell is rather thicker than of any recent ostrich egg that has been measured. When placing Dr. Andrews' examination on record in the " Ibis " for 1920 Mr. Bidwell suggested that for the sake of reference the species be called *S. indicus.*"

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, JULY 31, 1921.]

REPORT ON THE ORTHOPTERA OF MESOPOTAMIA AND PERSIA.

COLLECTED BY

MESSRS. P. A. BUXTON, M. A., AND W. E. EVANS, B. Sc.

DICTYOPTERA AND *ENSIFERA*.

BY

L. CHOPARD, D.Sc.

(*With three plates.*)

DICTYOPTERA.

FAM. – BLATTIDÆ.

Gen.—ISCHNOPTERA, BURM.

Ischnoptera evansi, n. sp.

(Fig. 1 and 2).

Type :—One female from Mesopotamia, Amara (at light, W. E. EVANS, 7-8-1918).

A small species for the genus, of a rather pale, very uniform testaceous colour. Head testaceous, the vertex exposed; face darkened between the eyes, which are widely separated; no ocellar spots visible. Antennæ testaceous, darker in the distal part. Maxillary palpi yellowish, the 4th joint shorter than the 3rd, much dilated at the apex, 5th joint long, brown at the apex which is acute. Pronotum testaceous, translucent laterally; anterior and lateral margins rounded, posterior margin slightly produced in the middle. Meso and metanotum testaceous with a small fuscous mark on each side. Abdomen testaceous with two lateral fuscous bands; supraanal plate translucent, slightly triangularly produced; subgenital plate broad, almost truncate at the apex.

Legs concolorous; front femora armed beneath on the outer edge with 5 or 6 spines subequal in length, rather strong, one of which is apical, on the inner edge, from base to apex, with 4 moderately strong spines, 10 very small ones, 1 rather large and 2 very long apical ones; tibiæ short, armed with 5 apical spurs, 3 superior (1 ext., 2 int.) and 2 inferior spines (1 ext., 1 int.); tarsi short, the 3 first joints spiny beneath, presenting two minute lateral spines at the apex, 4th joint very short, 5th almost as long as the metatarsus; arolia between the claws large. Intermediate and posterior femora armed with two internal apical spurs and 6 or 7 spines on each inferior margin; intermediate tibiæ armed with 5 apical spurs, 7 superior (2 ext., 3 med., 2 int.) and 6 inferior spines (3 ext., 3 int.); posterior tibiæ with 5 apical spurs, 13 superior (4 ext., 4 med., 5 int.), and 9 inferior spines (4 ext., 5 int.); posterior tarsi longer than those of the two other pairs.

Elytra and wings extending little beyond the apex of abdomen. Elytra very pale testaceous, almost transparent; marginal field broad, occupying more than the third of the total width of the tegmen; 8 costal veins; humeral vein furcate after the 8th costal, its superior sector giving 10 branches; the inferior one furcate at the apex; median vein trifurcate at its base; ulnar vein forming 4 branches, parallel, somewhat angled near their base. Wings hyaline; mediastinal vein furcate at the apex; humeral vein furcate little after the middle, having given 4 branches, its superior sector giving 5 more parallel branches, the inferior trifurcate at the apex; median vein very slightly sinuate; ulnar vein giving 3 branches towards the apex of the wing and 3 short ones to the dividing vein; axillary vein trifurcate.

Length of body, 13 mm.; length of pronot., 3·5 mm.; width of pronot., 5 mm.; length of tegmen, 12·7 mm.

This species looks very much like a *Blattella* but the venation of the wing is that of an *Ischnoptera* or rather an Ischnopterite as that large genus is much too comprehensive and should be restricted after examination of large series of the species referred to it.

Gen.—BLATTELLA, CAUDELL.

Blattella germanica, L.

Mesopotamia: Kurna, 20-5-18, 1 ♂; Amara, 27-11-17, 1 ♀; 10-6-18, 1 ♀; 30-6-18, 1 ♀; 7-8-18, 1 ♀ (at light).
Persia: Enzeli, 10-2-19, 1 ♂.
Cosmopolitan species.

Gen.—SUPELLINA, nov. gen.

Very closely allied to *Supella* Shelf. Male narrow and elongate, with tegmina and wings extending beyond the apex of abdomen. Head with eyes well separated; interocular space flattened, forming with the facial shield a subangular line. Tegmina with the discoidal sectors oblique; wings with the ulnar vein ramose, no apical triangle. Dorsal segments of abdomen unspecialized; supraanal plate very weakly produced; subgenital plate with styles well developed, almost symmetrical, inserted near the apex of the plate. Front femora armed anteriorly with two long apical spines and a row of very short, spiniform bristles, posteriorly with one apical spine and one before the apex of the inferior edge. Femora of the other legs armed with a few spines on each edge. Female unknown.

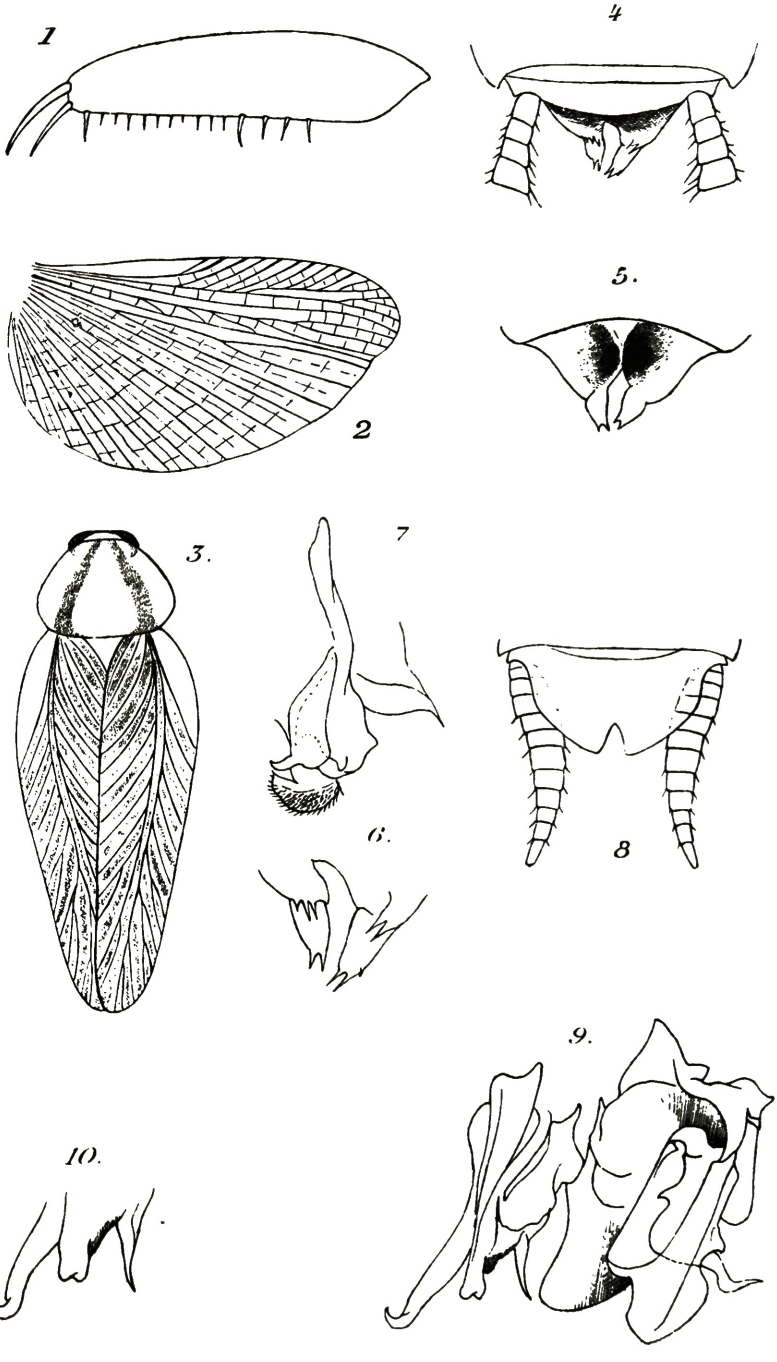
Genotype: *Supellina buxtoni*, n. sp.

Supellina buxtoni, n. sp.

(Fig. 3 to 7).

Type: One male from Mesopotamia, Amara (P. A. BUXTON, 14-9-1918.)

♂. Size medium, form slender. Colour very pale yellowish with two brown longitudinal bands on the pronotum, and numerous longitudinal brown lines on the elytra between the principal veins. Head elongate; occiput short, brown; interocular space wide; front, between the ocellar spots, whitish; face brown. Maxillary palpi long, brown, the last segment short, truncate. Antennæ brown. Pronotum broad, slightly convex, anterior and posterior margins almost straight, lateral margins convex; disk pale yellowish marked with two brown bands converging anteriorly; lateral portions transparent. Meso and metanotum testaceous. Abdomen testaceous with two brown lateral lines; supraanal plate, very short, subrounded at the apex; subgenital plate rather large and produced, emarginate at the apex, depressed on each side with a longitudinal keel in the middle. Cerci formed of 12 articles, depressed with their outer angle somewhat produced and rounded, the two distal ones much smaller. Style rather big, inserted almost in the midst of the posterior margin of the plate, armed with two very minute denticulations at their apex; the superior margin of the subgenital plate bearing 2 or 3 such denticulations at their base. Genital valves showing a long chitinous process and a rounded head entirely covered with stiff bristles. Legs rather long and slender, yellowish. Front femora armed anteriorly with two apical spines very close together, the superior one longer and curved, posteriorly with one apical spine and one about at the distal third of the inferior margin; anterior margin bearing about 30 spinuliform bristles from proximal third to the apex; tibiæ shorter than the femora, armed with 4 apical spines, 3 superior (1 ext., 2 int.) and 2 inferior ones. Intermediate and posterior femora armed with 4 or 5 spines on each margin



ORTHOPTERA OF MESOPOTAMIA AND PERSIA.

beneath; intermediate tibiæ armed with 5 apical spines, 8 superior (3 ext., 3 med., 2 int.) and 4 inferior ones (3 ext., 1 int.); posterior tibiæ with 5 apical, 13 superior (5 ext., 4 med., 4 int.) and 7 inferior spines (4 ext., 3 int.).

Elytra very long, their anterior margin somewhat sinuate, internal margin almost straight; humeral vein with 7 branches, the two apical of which are furcate; anal field elongate. Marginal field transparent, the remainder of the tegmina pale yellowish with longitudinal brown bands between the veins. Wings transparent, the costal veins somewhat darkened and clubbed; ulnar vein triramose, no intercalated triangle.

Length of body, 9·5 mm.; length of tegmen 10 mm.; width of tegmen, 3 mm.; length of pronot, 2·5 mm.; width of pronot, 3 mm.

This species shows very distinctive features in its general coloration, armature of the front tibiæ and apex of the abdomen. It seems closely related to *Supellia* Shelf., but cannot enter this genus on account of the lack of spines on the anterior margin of the front femora and the absence of a specialized gland on the abdominal tergites.

Gen.—BLATTA, L.

Blatta orientalis, L.

Persia: Enzeli, 19-6-19, 1 ♂.

Gen.—PERIPLANETA, BURM.

Periplaneta americana, L.

Mesopotamia: Amara, 1 ♀.

Gen.—SHELFORDELLA, ADELUNG.

Shelfordella tartara, Sauss.

(Fig. 8 to 10).

Mesopotamia: Amara, R. Tigris, 7-4-18, 2 ♀ (immature), common in fields; billets, etc.; 25-6-18, 1 ♂; 31-5-18, 1 ♂; 24-9-18, 1 ♂; 30-9-18, 1 ♂; Kurna, 20-5-18, 1 ♂.

This interesting species had not yet been recorded from Mesopotamia; the specimens collected by Mr. BUXTON agree fully with ADELUNG's description * There is very little to add to this very good description. The front femora are armed anteriorly with two long apical spines and 13 ones on the inferior margin, these being rather strong and regular; posterior inferior margin with 5 spines, one of which at the apex; front tibiæ with 5 apical, 3 superior (1 ext., 2 int.) and 6 inferior spines (3 ext., 3 int.). Intermediate and posterior femora armed beneath with 6-7 spines on each margin; intermediate tibiæ with 5 apical, 8 superior (3 ext., 3 med., 2 int.) and 8 inferior spines (4 ext., 4 int.); posterior tibiæ with 5 apical, 14 superior (5 ext., 5 med., 4 int.) and 13 inferior spines (7 ext., 6 int.). Genital valves rather short and broad, with three sharp hooks.

Gen —POLYPHAGA, BRULLE.

Polyphaga ægyptiaca, L.

Mesopotamia: Kurna, 20-5-18, 1 ♂; Basra, 16-8-17, 1 ♂; Amara, 7-3 17 1 ♀; 10-3-18, 1 ♀ (under palm logs); 27-4-18, 1 ♂ (flying).

Persia: Menjil, Gillan, 2,000 ft, 1 ♀ (running in stony desert).

Two egg-cases of this species have been collected by Mr. W. E. EVANS; they agree with the description given by Dr. W. INNES BAY (*Mem. Soc. ent. Eg.*. I [1912], p. 37), one being 10, the other 9 mm. long, both bearing 16 denticulations on the crest (fig. 11).

* *Horæ Societatis Entomologicæ Rossicæ*, XXXIX [1910] *p.* 331.

Polyphaga subhyalina, n. sp.

(Fig. 12 and 15).

Type : 1 ♂, from Persia, Qazvin, 4,000 ft., 25-8-19. (P. A. BUXTON).
Co-types : 2 ♂, same locality, 30-9-19.

♂. Medium sized species ; form elongate, coloration very pale, not very hairy. Head small, occiput and forehead black with long reddish hairs, face and mouth parts very pale yellowish Eyes very large, black, a little more approximate than the ocelli ; these are big, yellow, the space between them forming a rounded keel. Antennæ rather thick, yellow. Maxillary palpi yellow, the 3rd article longer and thicker than the 4th, the 5th comparatively very short, truncate. Pronotum small, short and broad, its anterior margin fringed with long hairs, its surface covered with short, silky, reddish hairs ; general shape regularly oval, the anterior margin feebly truncate, clearing the summit of the head ; disk slightly convex, adorned with symmetrical brown lines, forming a triangular impression. Abdomen broad, whitish, almost glabrous ; supraanal plate small, rounded at the apex ; subgenital plate a little a symmetrical, with no style, its posterior margin concave, lined with short spinuliform hairs, angles rounded. Cerci short, yellowish. Genital valves short, folded on the right, presenting a long hook on the left.

Legs yellow, rather short. Front femora bearing long, irregular bristles ; tibiæ armed with 8 spines round the apex and 1 on the upper margin ; tarsi long and slender, the metatarsus equaling the other joints together. Intermediate femora bearing scarce long bristles and armed with 1 external genicular spine ; tibiæ armed with 7 long apical spurs, 6 superior (2 ext., 2 med., 2 int.), and 2 inferior spines (1 ext., 1 int.). Posterior femora armed as the intermediate ones ; tibiæ with 7 spurs, the longer one much shorter than the half of the metatarsus, 11 superior regularly disposed (5 ext., 3 med., 3 int.), and 5 inferior spines (2 ext., 3 int). Tarsi long, all the articles covered with spinelets ; arolia between the claws small.

Elytra extending much beyond the apex of abdomen, almost transparent with numerous small greyish spots and the costal area whitish ; humeral vein sending 6 or 7 branches to the internal margin ; branches of the median vein very numerous, 12 to 14 ; anal field short. Mediastinal vein with a small inferior lobe. Wings transparent except a few small greyish spots near the apex and a narrow white opaque band along the anterior margin in its apical midst ulnar vein with 5 branches; 1st axillary vein with 10 branches.

Length of body,13 mm.; length of pronot., 3·5 mm. ; width of pronot., 6 mm. ; length of tegmen, 19·5 mm.; width of tegmen, 7 mm.; post tib. 5·6 mm.; post. metatarsus, 6 mm.

Although looking much like *H. livida* Burm., at first sight, this species belongs to the *algerica* group, having the spines of the posterior tibiæ regularly disposed along the whole length of the tibia. *H. Roseni* Brancs, seems to be a very close species but BRANCSIK does not speak in his description of the disposition of the tibial spines ; anyhow, the shape of the pronotum is different from that of the present species, the elytra and wings are shorter and the tarsi possess no arolium.

Polyphaga africana, L.

Mesopotamia : Azijiysh, R. Tigris, 1-11-18, 1 ♂ ; under flood refuse, slopes of Jebel Hamrin, 1 adult and 2 young ♀ (?).

The male specimen here referred to agrees quite well with the good figure of this species given by SAVIGNY (Descr. de l'Egypte, Orth., pl. II, fig. 11), but the anterior part of the pronotum is not whitish ; I do not think this colour variation is sufficient to authorize the creation of a species or even a geographical race. There is a very distinct small arolia between the tarsal claws and the posterior

tibiæ are armed with 9 superior spines, the three distal ones forming a group not very clearly separated from the other 6 ; 4 inferior spines inserted in the distal half of the tibia, of which 2 external and 2 internal, the latter much longer.

The female specimens seem to belong to the same species, showing the same tibial armature ; there is no tarsal arolia but this must be characteristic of the females of all the species of this genus. The adult specimens are covered with a reddish hairy clothing and show the supraanal and subgenital plates slightly notched at the apex.

Polyphaga persica, n. sp.

(Fig. 14 and 16).

Type :—One male from Persia, Qazvin, 4-9-1919 (P. A. Buxton).

Size medium, form rather short and stout, coloration testaceous brown with numerous small brownish spots on the tegmina. Head hidden by the pronotum ; occiput and forehead black ; facial shield and clypeus yellow, the former depressed, the latter forming a protuberance with a fine median furrow. Eyes large, black, as distant one from the other as the ocelli ; these are very large, yellow, oval ; between them is a tuft of reddish hairs. Maxillary palpi testaceous, the last joint much shorter than the fourth one. Antennæ brownish, thick.

Pronotum rather wide, testaceous, covered with long reddish hairs ; a narrow band along the anterior border almost transparent, posterior part somewhat darkened, 8 small black spots on the disk which is convex ; anterior margin slightly produced in the middle, lateral margins almost straight, posterior one convex. Mesonotum testaceous, its posterior margin subangulate, its exposed part very large, brownish.

Abdomen broad, depressed, testaceous above, yellowish with reddish hairs beneath. Supraanal plate small, subtriangular, its posterior margin sinuate, apex feebly notched ; subgenital plate a symmetrical, its posterior margin sinuous, thick, covered with reddish hairs ; styli irregular, the right one much shorter than the left which is inserted in the concavity of the margin. Cerci very short, testaceous.

Legs yellowish ; anterior femora provided with very long hairs and a few spiniform bristles on the inferior inner edge ; tibiæ very short, armed with 8 strong spines round the apex and 1 on the superior margin ; tarsi long, rather slender, the metatarsus equaling the other joints together ; no arolia between the claws. Intermediate and posterior femora provided with long bristles, without genicular spines ; intermediate tibiæ with 7 very long apical spurs, 7 superior (4 ext., 2 med., 1 int.) and 1 inferior spines ; posterior tibiæ with 7 apical spurs, 10 superior (4 ext., 3 med., 3 int.) and 4 inferior (2 ext., 2 int.) spines, the superior ones forming 3 imperfectly limited groups. Tarsi longer and thinner than the anterior ones, the metatarsi longer than the other joints together.

Elytra and wings extending beyond the apex of abdomen. Elytra very broad, chiefly near the apex, subhyaline with many little greyish spots ; marginal field narrow, whitish ; humeral, median and ulnar veins with numerous parallel branches. Wings slightly smoky, chiefly towards the apex and along the anterior margin ; anal angle very pronounced. Veins brownish ; median vein emitting 9 branches, ulnar vein with 13 branches ; many of the radiate veins are furcate.

Length of body, 15·5 mm.; length of pronot., 4·5 mm.; width of pronot., 7 mm.; length of elytra, 18·5 mm.; width of elytra, 6·5 mm.

This species has exactly the same form and size as the preceding ; it differs from it by its general colour and by the absence of arolia between the tarsal claws. The hook of the genital valves (fig. 13-14) is much thicker and more curved in *africana* than in *persica*.

FAM.—MANTIDÆ.

Gen.—MANTIS, L.

Mantis religiosa, L.

Mesopotamia: Amara, nov. 1917, 2 ♂, 3 ♀; Kizil Robat, north-east of Baghdad, 1 ♂, 1 ♀; Masharra Canal, Amara, 8-6-18, 1 ♀.

Gen.—IRIS, SAUSS.

Iris oratoria, L.

Mesopotamia: Kut el Amara, R. Tigris, 9-8-18, 1 ♂; Shahroban, R. Diala, 30-7-18, 1 ♂.

Gen.—FISCHERIA, SAUSS.

Fischeria fasciata, Thunb.

Mantis fasciata, Thunberg, 1815, *Ac. Petersb.* V., p. 292; *Fischeria faciata*, Giglio-Tos, 1916, *Bull. Soc. ent. it.* XLVII [1915], p. 21; *Fischeria baetica*, Rambur, 1839, Faune And. II, p. 19, pl. 1, fig. 1,2.

Mesopotamia: Amara, 11 and 20-9-18, 1 ♂, 2 ♀;—Kut el Amara, R. Tigris, 9-8-18, 2 ♂.

Three male specimens, collected by Mr. P. A. Buxton, are very much larger than Spanish examples (length of body, 68 mm.; length of pronot., 18 mm.: length of tegmen, 47 mm.); they are quite similar to these in every other respect but might be considered as a local race.

Gen.—BOLIVARIA, STAL.

Bolivaria brachyptera, Pall.

Persia, Qazvin, sept. 1919, 2 ♀.

Gen.—EMPUSA, ILLIGER.

Empusa egena, Charp.

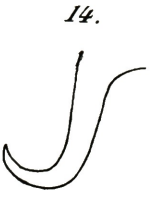
Mesopotamia: Amara, R. Tigris, April 1918, 1 ♂;—Masharra, 20-3-18 1 young ♀.

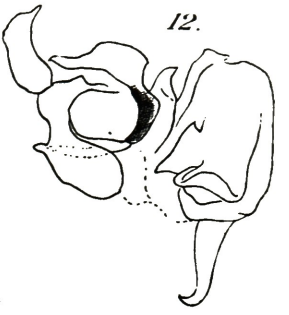
Empusa uvarovi, n. sp.

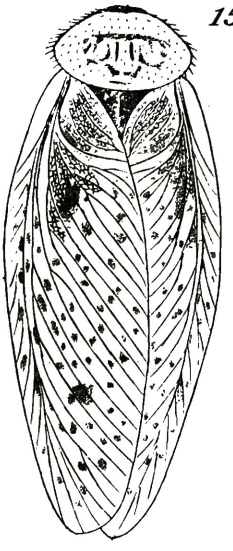
(Fig. 17).

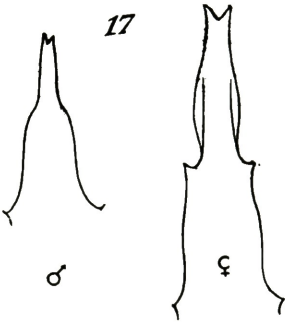
Types:—One male from Mesopotamia, Amara, on Alhagi, margin of dry marsh (W. E. EVANS, 12-9-18).—One female, same locality (P. A. BUXTON, 10-9-1918).

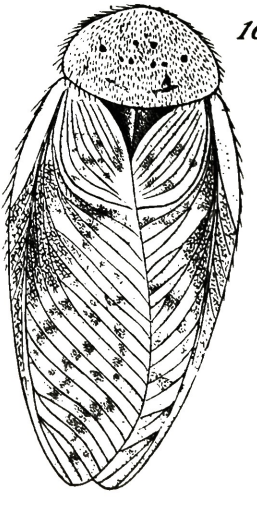
Very much like *E. egena* Charp., but smaller. Male with conical process of vertex rather short, rounded above, slightly furcate at the apex; prothorax slender weakly denticulated anteriorly, its posterior part almost unarmed. Elytra transparent, tinted with greenish near the anterior border and the apex; marginal field opaque, green with the extreme border yellow (in life wholly green ?) and a narrow yellow band (in life green ?) along the humeral vein, extending from base to the stigma which is yellow; median vein furcate on the stigma, its superior branch furcate; discoidal vein trifurcate. Wings transparent, greenish near the apex; discoidal vein furcate. Legs green banded with yellowish (in life wholly green ?); lamellar expansions of the femora smaller than in *E. egena*, subtriangular. Female with process of vertex rather short, divided in two almost equal parts, the apical one rounded above, canaliculate beneath,

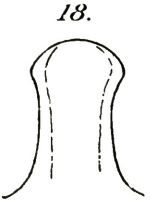


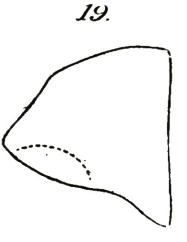












ORTHOPTERA OF MESOPOTAMIA AND PERSIA.

its sides convex and weakly lamellar; prothorax as in the male but more strongly denticulate. Tegmina almost entirely of a fine green with the same yellow marks as those of the male; wings more greenish than those of the male; lamellar dilatations of the femora as in the male. Abdomen similar to that of *E. egena* but with weaker median and lateral lobes.

Length of body, ♂, 48 mm. ♀, 56 mm.; length of pronot, ♂, 19·5 mm. ♀ 23 mm; length of ant. fem., ♂, 11·5 mm. ♀, 14,5; elytra, ♂ 26·5 mm. ♀ 34 mm.

This species is much smaller and more slender than *E. egena*; it differs from it by the shape of the process of the vertex and by its tegmina much more brightly coloured. It seems very close to *E. unicornis* Johans. but the prothorax is comparatively much shorter than in this last species and the shape of the vertex of the female seems intermediate between that of *E. unicornis* and *E. egena*.

I take much pleasure in dedicating this beautiful Mantid to Mr. B. UVAROV who has so carefully studied the Orthopterous fauna of West Asia.

Gen.—BLEPHAROPSIS, REHN.

Blepharopsis mendica, F.

Mesopotamia: Amara, R. Tigris, may 1917, 1 ♂; 7-4-18, 1 ♂; 16-9-18 (at light) 1 ♀; 27-9-18, 1 young.

ENSIFERA.

FAM.—PHASGONURIDÆ.

Gen.—HOMOROCORYPHUS, KARNY.

Homorocoryphus nitidulus, Scop.

Mesopotamia: Amara, 20-10-17, 2 ♀; 30-10-17, 1 ♀.

Gen.—CONOCEPHALUS, THUNB.

Conocephalus fuscus, F.

Persia: Enzeli, 20-6-10, 1 ♂.

Conocephalus fuscus turanicus, Semenof.

Xiphidium fuscum turanicum, Semenof, 1915, *Rev. russe Ent.*, XV [1915] p. 451.

Mesopotamia; below Amara, on Tigris, 15-5-18, 1 ♀; 22-10-18, 1 ♂, 1 ♀,

Conocephalus buxtoni, n. sp.

(Fig. 18 to 20).

Type:—One male from Mesopotamia, Amara (P. A. BUXTON, 30-6-18).

Size medium, form rather slender; general colour pale green, dorsum of head and pronotum with a broad median band of reddish brown; on pronotum, this band is outlined on each side with opaque yellow. Head with dorsum of vertex very slightly ascending above the plane of the occiput; fastigium of vertex narrow, little more than half as wide as the basal antennal joint, very slightly enlarged at apex. Pronotum with lateral lobes high, their posterior margin very weakly convex, callosity slightly convex, broad. Abdomen slender, 10th tergite notched at apex, subgenital plate truncate, bearing rather long, cylindrical styles. Cerci very large, almost triangular, the internal margin being strongly produced in a triangular process, ending in a small tooth directed downwards; apex rounded, medial portion somewhat swollen, part of the internal margin between the process and the apex depressed, almost lamellar.

All the femora unarmed beneath; anterior and intermediate tibiæ with 6 pairs of inferior spines; posterior femora with 2 very small genicular spines on each side. Elytra much longer than the posterior femora, a little shorter than the wings.

Length of body, 14·5 mm.; post. fem., 12 mm.; length of tegmen, 19 mm.; length of wing, 20·5 mm.

The present species is very interesting as it belongs to the subgenus *Neoxiphidion* which contains chiefly American forms; only two species of this subgenus have been described from the palearctic region; *C. japonicus* Redt., from Japan and *C. Chavesi* Bol., from Azores. Those three forms may be distinguished as follows:—

1. Cerci of ♂ dentate in the middle; dorsum of vertex and pronotum unicolorous; tegmina shorter than posterior femora which are spinose beneath. ..... *C. japonicus*, Redt.

—Cerci of ♂ dentate before the middle.....2.

2. Posterior femora longer than the body and than tegmina; their inferior margin with 1 or 2 spines.....*C. chavesi*, Bol.

—Posterior femora entirely unarmed beneath, shorter than the body; tegmina very long..... *C. buxtoni*, Chop.

Gen.—PHASGONURA, STEPH.

Phasgonura viridissima, L.

Mesopotamia: Amara, May 1918, 1♂, 4♀.

Gen.—TETTIGONIA L.

Tettigonia albifrons, f.

Mesopotamia: Amara, May 1918, 2♂, 1♀.

Gen.—PHOLIDOPTERA, WESMAEL.

Pholidoptera persica, n. sp.

(Fig. 21 to 23).

Types:—One male from Persia, Qazvin, 20-7-19 (P. A. BUXTON)—One female, same locality, 20-9-19.

Reddish grey or brownish. Head concolourous; occiput a little darkened behind the eyes; fastigium of vertex short, broader than the first joint of antennæ, slightly rounded at the apex, convex above, narrowing beneath and separated from facial shield by a transverse furrow; face glabrous, shining, yellowish or brownish; facial shield and clypeus with two small blackish impressions. Pronotum concolorous with indistinct blackish marks on the disk; shape similar in both sexes, somewhat produced posteriorly, lateral lobes high, their inferior margin subangulate, anterior margin straight, posterior one subtruncate, lined, black; disk without keels, convex anteriorly, feebly depressed posteriorly; prosternum unarmed. Abdomen concolorous with about 10 small black spots on the posterior edge of each tergite to the 7th; 10th tergite of male presenting two long, almost cylindrical processes; supraanal valve triangular; cerci short, bluntly curved near the apex which is dentiform; subgenital plate large, weakly emarginate at the apex; style cylindrical, equaling about the third of the plate. Titillators short, slightly curved at the apex, basal part inflated with many small spines. Female with 10th tergite emarginate, bearing short processes similar to those of the male; cerci conical; subgenital plate large, very widely concave at the apex. Ovipositor very short and thick, gently curved, blackish at the apex.

Legs concolourous, rather short and stout. Front femora thick, armed beneath with 3 small black spines on the inner edge; tibiæ longer than the femora, armed above with 3 external spines, beneath with 6 rather strong ones on each side; tarsi very short, the metatarsus scarcely longer than the 2nd joint. Intermediate femora longer than the anterior ones, bearing, like those, 3 very small black spines beneath; tibiæ armed above with 2 external, 4 internal spines, beneath as the anterior ones. Posterior femora short and stout, armed beneath with 4-5 small black spines on the outer edge, 2-3 on the inner edge; tibiæ a little shorter than the femora, with 4 apical spurs and 6-7 small spines inserted in a black spot on each inferior margin, the apical ones much longer than the others; about 25 spines on each superior margin; tarsi short, the free plantulæ equaling scarcely half the length of the metatarsus.

Elytra extending in both sexes a little beyond the apex of the 1st abdominal tergite; they are brownish with blackish spots between the anastomosed veinlets which are very numerous; ♂ with 3 lateral veins; humeral vein simple, thick, sinuate near the apex; discoidal vein furcate; ♀ with 2 lateral veins and 3 dorsal ones.

Length of body, ♂, 25mm., ♀, 26 mm; length of pronot., 8 mm.; ant. fem., 6·5 mm.; ant. tib., 7·7 mm.; interm. fem., 8·5 mm.; interm. tib., 8·5 mm.; post. fem. 21·5 mm.; post. tib. 20·5 mm.; ovipos., 13 mm.

This species is very distinct by reason of its stout stature, the small black spines of all the femora, the very short free plantulæ of the posterior metatarsi, the form of the anal segment of the male and the brevity of ovipositor. It might perhaps enter the genus *Ariagona* Krauss, previously known from a single canarian species, as well as *Pholidoptera*.

Gen.—METRIOPTERA, WESMAEL.

Metrioptera escalerai, Bolivar.

Mesopotamia: Amara, R. Tigris, May-June 1918, 4 ♂, 4 ♀.

Metrioptera persica, Uvarov.

(Fig. 24 to 26).

Platycleis persica, Uvarov, 1917, *Bull Mus. Caucase*, XI, p. 11, fig. 9.

Mesopotamia, Amara, R. Tigris (W. E. EVANS, June 1918) 1 ♂, 1 ♀.

This species is known only from the female; the specimens here referred to have been identified by M. B. UVAROV himself, who had the kindness to send me the undescribed male.

♂ (Macropterous). Slender, smaller than the female, almost unicolourous testaceous. Anal segment very deeply and acutely divided at the apex, forming two long acute processes, the basal part of the tergite angularly folded; sub-genital plate large with two longitudinal keels, apex deeply and narrowly notched, presenting above two small black lines along the sides of the hollow; styli rather long, cylindrical. Cerci stout, as long as the processes of 10th tergite, narrowing towards the apex, bearing at their proximal third a strong internal tooth. Titillators slender, strongly curved, armed with a few small spines.

Length of body, 18·5 mm.; length of pronot., 4·8 mm.; elytra 20·5 mm.; post fem., 18 mm.; post. tib., 16 5 mm.

Gen.—PARADRYMADUSA, HERMAN.

Paradrymadusa qazvinensis, n. sp.

(Fig. 27 to 30).

Types:—One male from Persia Qazvin, (P. A. BUXTON, Nov. 1918) and one female, same locality (P. A. BUXTON, 17, July 1919).

Large species, testaceous or rufous brown. Occiput concolorous; apex of vertex not much broader than the first article of antennæ; face yellowish.

shining, glabrous. Pronotum rather strongly produced backwards in both sexes, its anterior margin straight, the posterior one convex; lateral lobes high, their inferior margin subangulate, widely bordered with yellow; prosternum with two small spines. Tenth abdominal tergite of male very deeply and angulately emarginate at the apex, supraanal valve triangularly produced; cerci short and stout, bearing a small apical tooth, directed outwardly, their internal face slightly extending in a blade, bearing an acute tooth about the middle; subgenital plate wide, slightly concave at the apex; ; styli ? (wanting). Tenth tergite of female like that of the male but less deeply emarginate, supraanal valve smaller, feebly produced; cerci short, conical; subgenital plate wide, its posterior margin emarginate, forming two rounded lobes with two small tubercles near the apex of the notch. Titillators angled, the inferior border of their apical part armed with a few strong spines. Ovipositor long and almost straight, apical margin of the valves obliquely truncate.

Legs concolourous; anterior coxæ with a very long, strong spine; femora stout, armed inwards with 3 or 4 inferior spines and a very small genicular one; tibiæ armed above with 3 external spines, beneath with 6 spines on each margin; intermediate femora armed with 2 small genicular spines and 1 to 4 inferior external ones; tibiæ armed above with 2 external, 4 internal spines, beneath with 6 spines on each margin. Posterior femora very long, armed beneath with 5 internal, 7-8 external small spines and 2 small genicular ones; tibiæ a little longer than the femora, armed with 4 inferior apical spurs, 12 acicular small spines on each inferior border and 2 superior apical spurs, 30-31 external and 26-27 internal rather strong spines. Tarsi rather long, 2nd joint almost as long as the 1st, 3rd short, very much depressed, free plantulæ of the metatarsus much shorter than the half of the metatarsus.

Elytra of the male extending almost to the apex of the 2nd abdominal tergite, rufous brown with the marginal field whitish and a fulvous marking near the internal angle; anterior margin weakly convex, apex truncated, internal margin sinuate; 2 lateral veins, humeral vein furcate. Elytra of the female almost hidden by the pronotum, rounded, their sutural margin slightly overlapping.

Length of body, ♂, 27 mm., ♀, 25 mm.; length of pronot., ♂, ♀, 10 mm; elytra, ♂ 7 mm., ♀, 4·5 mm ant. fem., ♂ ♀, 9·5 mm.; ant. tibiæ, ♂ ♀, 11 mm.; interm., ♂ ♀, 11 mm.; interm. tib., ♂ ♀, 12 mm.; post. fem., ♂ ♀, 33·5 mm; post. tibiæ, ♂ ♀, 32·5 mm.; ovipos., 26 mm.

Gen.—MAGRETTIA, BR.

Magrettia mutica, Br.

Magrettia mutica, Brunner von Wattenwyl, 1888, *Verhandl.k-k.zool-bot. Ges. Wien*, XXXVIII, p. 285, fig. 18—Adelung 1902, *Ann. Mus.Zool.Ac.Sc. Petersb.*; VII, p. 16.

Mesopotamia: Ruz, 16-18 (W. E. EVANS), 1 young male, in tuft of earth.

Although immature this example shows the principal features given in ADELUNG'S very good redescription of this interesting species.

FAM.—GRYLLIDÆ.

Gen.—GRYLLOTALPA, LATR.

Gryllotalpa gryllotalpa, L.

Mesopotamia: Amara, R. Tigris, 10-12-17, 1 ♂; 30-3-18, 1 ♂.

Gen.—TRIDACTYLUS, OLIV.

Tridactylus savignyi, Guer.

Mesopotamia: Amara, R. Tigris, 10-4-18, 1 ♂; 30-6-18, 1 ♂.

Those two specimens are large (5 mm.) and of a very recessive coloration.

Gen.—PTERONEMOBIUS, JACOBS.

Pteronemobius gracilis, Jak.

Gryllus gracilis, Jakovleff, 1871, *Hor. Soc. ent. Ross.*, VI, p. 20, tab. 1, fig. 3, 3a.—*Nobius mayeti*, Finot, 1893, *Ann. Soc. ent. Fr.*, Bulletin, p. 252.—*Nemobius adelungi*, Uvarov, 1912, *Hor. Soc. ent. Ross.*, XL., p. 39.

Mesopotamia: Amara, R. Tigris, April-June 1918 (P. A. BUXTON), 4 ♂, 11 ♀;—Amara, at light (N. E. Evans, 7-8-18), 2 ♂, 1 ♀.

MR. B. UVAROV himself supposed that his *N. adelungi* was the same species as the north African *N. mayeti*; after a careful comparison between the specimens collected in Mesopotamia and examples of *N. mayeti* from Algeria, I cannot hesitate to publish this synonymy; but, in its turn, as M. UVAROV makes me remark, the latter species must fall in synonymy with *Gryllus gracilis*, Jak. which, although descripted in Russian, is valid, the drawing being quite sufficient to recognize the insect. The species is a *Pteronemobius* as the male possesses a tubercle-like spine very near the base of the internal border of the posterior tibiæ.

Gen.—ACHETA, L.

Acheta bimaculata, De Geer.

Mesopotamia: Amara, 9-8-18, at light, 1 ♂; under stone by Diala River north-east of Baghdad, 1 young.

Acheta amarensis, n. sp.

Types:—One male, one female from Mesopotamia, Amara (P. A. BUXTON, 26-6-18).

Co-type:—One male, same locality.

Rather small species, wholly shining black, very similar to *A. morio*, F. Head smaller than in this latter species, scarcely wider than the pronotum; ocelli extremely small, disposed almost in a straight line; face tumid. Pronotum as wide posteriorly as anteriorly, its posterior border almost straight. Abdomen black; subgenital plate of ♂ very much compressed, that of ♀ small, notched at apex. Ovipositor shorter than the posterior femora. Legs black; the posterior femora somewhat tinged with reddish at their inferior margin chiefly in the male; posterior tibiæ short, armed with 3 external and 4 internal very strong spines; internal spurs strong, the superior decidedly longer than the intermediate one; metatarsi longer than the other joints of the tarsus, somewhat dilated in the middle, their internal face rounded, the external one depressed; external superior margin keeled and armed with 3 rather strong spines, the internal one rounded, armed with 1 apical spine; apical spurs strong, the internal extending a little farther than the midst of the last joint of the tarsus.

Tegmina of male as long as the abdomen; speculum broader than long, rounded anteriorly; diagonal vein rather long, slightly sinuate; 3 postaxillary veins, the 2nd one very much curved; 2 veinlets between the diagonal and the postaxillary veins; 3 oblique veins; apical field rather short with 6 longitudinal veins and a very wide, somewhat irregular reticulation. Lateral field black with 5 longitudinal veins and the mediastinal which is triramose and very much curved at apex. Tegmina of female with 9 dorsal veins, the 5 internal of which very close, the 4 others separated by veinlets forming a wide reticulation; 5 veins in the lateral field and the mediastine which is triramose as in the male but not curved at apex. Wings candate, blackish near the anterior border.

Length of body, ♂, 16 mm., ♀, 18 mm.; length of tegmina, ♂ ♀, 11 mm.; length of wings, ♂, 17 mm., ♀, 17·5 mm.; post. fem., ♂ ♀, 8·5 mm.; post. tib., ♂ ♀, 6 mm.; post. tarsi, ♂ ♀, 4·5 mm.; ovipos. 8 mm.

Individual variations.—The second male of this species has tegmina a little shorter than the abdomen, with no veinlet between the diagonal and post-axillary veins and 7 longitudinal veins in the lateral field.

This species looks very much like the African *A. morio*, F., of which it differs however by many small features, the most striking of which is the form of the posterior metatarsus (fig. 31).

Gen.—GRYLLUS, L.

Gryllus desertus, Pallas.

Mesopotamia: Amara, April-May 1918, 3♀; Kut-el-Amara, 7-8-18, 1♀; Kurna, 20-3-18, 1♀.
Persia: Enzeli, 1♀.
All these examples belong to the macropterous form *desertus*, Pall.

Gryllus domesticus, L.

Persia: Qazvin [4,000 ft.], 17-9-19, 2♀.

Gryllus tartarus, Sauss.

Mesopotamia: Basra, 30-6-18, 1♀; 12-8-18, 1♀; Amara (W. E. EVANS), very common at light.

Gryllus chinensis, Web.

Mesopotamia: Amara, May-Sept. 1918, 5♂, 3♀.
All these examples belong to the *Cerisyi* form; two of them are very large with the veins of the lateral field of the tegmina almost straight and quite equidistant.

Gryllus frontalis, Fieb.

Mesopotamia: Kizil Robat, N.E. of Baghdad, 1 young ndividual.

Gen.—GRYLLODES, SAUSS.

Gryllodes lateralis, Fieb.

Mesopotamia: Amara, 2-11-17, 1 immature ♀.

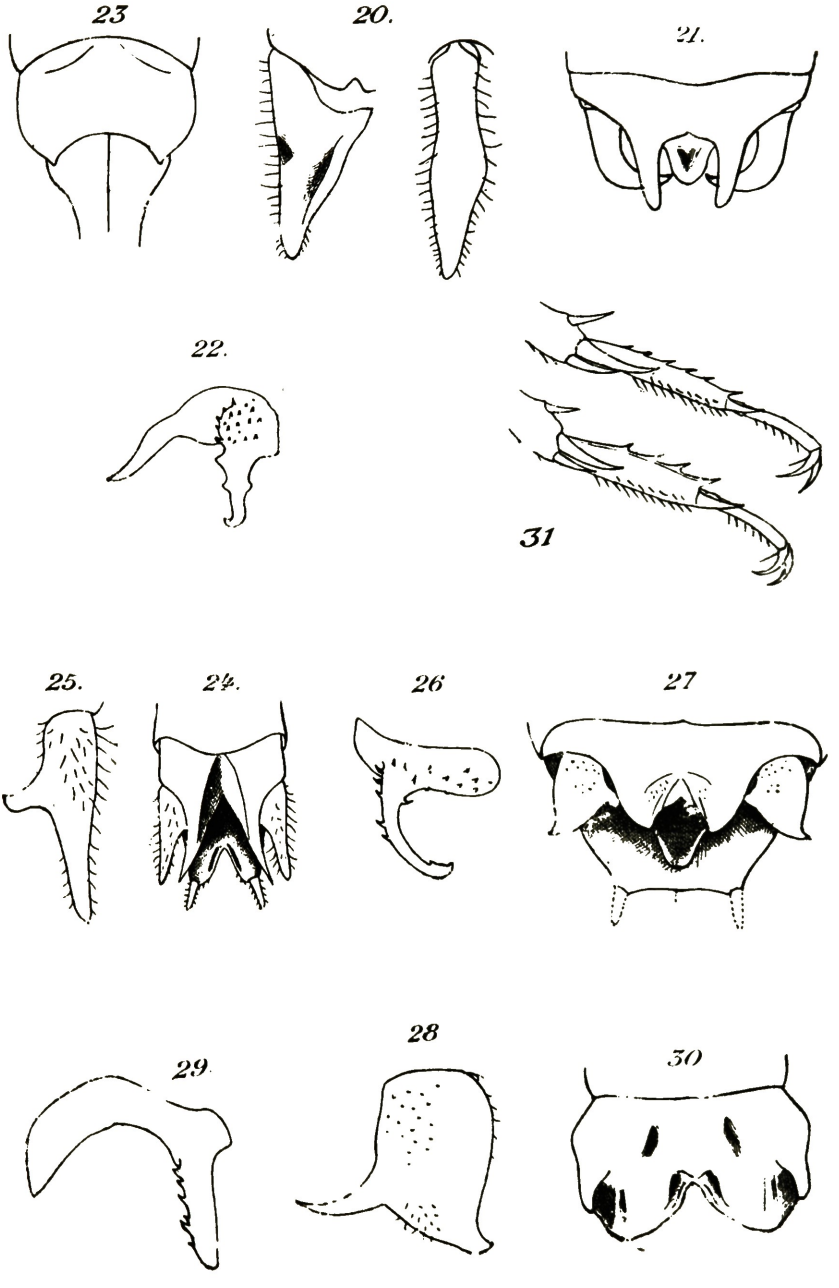
Gryllodes macropterous, Fuente.

Mesopotamia: Amara, April-June 1918 (P. A. BUXTON), 5♂, 1♀; 2-7-18 at light (W. E. EVANS), 1♀.
Compared with a typical male from Ciuadad Real (I. BOLIVAR in coll. Finot) the ♂ examples cannot possibly be differentiated from it; yet 3 of them are smaller and less coloured, one being almost wholly pale yellow, but they show absolutely no other character allowing us to consider them as a different species.
The females are a little smaller, very pale yellowish, with a small head. I refer them with much doubt to this species although they may be considered as a small variety with very recessive coloration, corresponding to the ♂ which is above recorded.

Gen.—METIOCHE, STAL.

Metioche, sp.

Mesopotamia: Amara, on herbage by Tigris (W. E. EVANS, 19-9-18), 1♀.
This specimen must belong to one of the species described by STAL from the oriental region (*M. coleoptrata, M. tibialis, M. pallipes*); it is quite impossible to separate those species with the author's short diagnosis and very possibly



Orthoptera of Mesopotamia and Persia.

there may be only one species. The specimen here referred to looks very much like the ♀ of *Trigonidium cicindeloides*, Ramb., but the elytra are not so convex, with false veins between the longitudinal nervation; the antennæ are testaceous with the two first articles black. Legs testaceous, anterior tibiæ, tarsi and spines of the posterior tibiæ feebly darkened; anterior tibiæ showing no auditory foramen but a depression at base of the inner face, this being certainly a character of the wingless condition of the species.

The types of all the new species have been deposited in the British Museum.

Explanation of Plates.

Plate I.

Fig. 1. *Ischnoptera evansi*, n. sp.—Internal face of anterior tibia, × 6.
Fig. 2. *Ischnoptera evansi*, n. sp.—Venation of Wing, × 4.

Supellina buxtoni, n. sp.

Fig. 3. Male, dorsal view, × 4·5.—Fig. 4. Apex of abdomen, dorsal view, × 12.—Fig. 5. Subgenital plate, × 12.—Fig. 6. Styli, dorsal view, × 26. Fig. 7.—Genital valves, × 16.
Fig. 8. *Shelfordella tartara*, Sauss.—Supraanal plate and cerci of ♂, × 6.
Fig. 9. *Shelfordella tartara*, Sauss.—Genital valves, dorsal view, × 10.—Fig. 10. Apex of left valves of same, × 12.

Plate II.

Fig. 11. Egg-case of *Polyphaga ægyptiaca*, L., × 4.—Fig. 12. *Polyphaga subhyalina*, n. sp.—Genital valves, dorsal view, × 17.—Fig. 13. Hook of genital valves of *Polyphaga africana*, × 26.—Fig. 14. The same hook of *P. persica*, n. sp.
Fig. 15. *Polyphaga subhyalina*, n. sp.—Dorsal view of male, × 3.
Fig. 16. *Polyphaga persica*, n. sp.—Dorsal view of male, × 3.
Fig. 17. *Empusa uvarovi*, n. sp.—Dorsal view of process of vertex, × 6.
Fig. 18. *Conocephalus buxtoni*, n. sp.—Fastigium of vertex, × 17.—Fig. 19. Id.—Outlines of lateral lobe of pronotum, × 6.

Plate III.

Fig. 20. Id. Dorsal and lateral outlines of cercus of ♂, × 12.—Fig. 21. *Pholidoptera persica*, n. sp.—Apex of abdomen of ♂, × 6.—Fig. 22. Id. Left titillator, × 16.—Fig. 23. Subgenital plate of ♀, × 6.
Fig. 24. *Metrioptera persica*, Uvarov.—Apex of abdomen of ♂, dorsal view, × 6.—Fig. 25. Id. Right cercus, dorsal view, × 12.—Fig. 26. Id. Right titillator, × 16.—Fig. 27. *Paradrymadusa qazvinensis*, n. sp.—Apex of abdomen of ♂, dorsal view, × 6.—Fig. 28. Id. Right cercus, dorsal view, × 12.—Fig. 29. Id. Left titillator, × 16.—Fig. 30. Subgenital plate of ♀, × 6.
Fig. 31. External face of posterior tarsi of *A*, *Acheta morio*, F.; *B*. *A. amarensis*, n. sp.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, JULY 31, 1921.]

A CONTRIBUTION TO OUR KNOWLEDGE OF THE *ORTHOPTERA ACRIDIODEA* OF MESOPOTAMIA AND N. W. PERSIA.

BY

B. P. UVAROV, F.E.S.

The material for this publication was collected by Dr. P. A. Buxton and Mr. W. Edgar Evans during their active service with the Mesopotamian Force, and kindly submitted to me for working out. As the Orthopteran fauna of Western Asia has always interested me very much, I am extremely obliged to Dr. Buxton and Mr. Evans for placing this material at my disposal. The spelling of native geographical names adopted by me in the following list is generally in accordance with the map of N. W. Persia, issued with Dr. Buxton's article on the Birds of N. W. Persia in this number and with the map of Mesopotamia which was published with Capt. R. E. Cheesman's on the mammals of Mesopotamia. In some instances, however, I used somewhat different spelling; thus, instead* Qazvin—Kazvin; Talish—Talysh.

LIST OF SPECIES.

1. *Paratettix meridionalis* Ramb.—Numerous specimens from Amara, Baghdad, Enzeli and Qurnah (side of stream).
2. *Acrida turrita deserti*, Uvarov †.—This desert race of common *Acrida turrita*, St., has been described by myself from Eastern Transcaucasia and Transcaspia; in Dr. Buxton's collection there is a pair (1 ♂, 1 ♀) of the same from Kazvin taken, 17—20-7-19, so it is obvious that it is distributed over Persia as well.
3. *Acridella miniata* (Klug).—Garden by Tigris, below Amara, 3-6-18, 1 ♂ taken by W. E. Evans. The species is known from Algeria, Egypt, Arabia and Beluchistan; I have also seen the specimens from Palestine.
4. *Acridella robusta* (Uvarov).—Amara, 5—14-6-18, 3 ♂ ♂, taken by Dr. Buxton. I know this species, previously described by myself ‡ from Eastern Transcaucasia and from different localities of Kurdistan and Persia. It is now evident that it is distributed all over the Persian and Mesopotamian deserts.
5. *Duroniella fracta* (Krauss).—Garden above Amara, 9-4-18 (Mr. Evans).
6. *Ochrilidia tibialis*, Fieb.—Baghdad, 23-9-17. (Dr. Buxton); Amara, 20-10-17 (Dr. Buxton); garden above Amara, 28-6-18 (Mr. Evans); Chahala, nr. Amara, among grass, 30-10-17.
7. *Parapleurus alliaceus*, Germ.—Enzeli, 20-6—10-7-19 (Dr. Buxton). This species is boreal in its origin and has not been known as yet from the Southern shore of the Caspian Sea; the whole fauna of this locality (Gilan) is remarkable for the presence of several truly boreal forms.
8. *Stauroderus bicolor* (Charp.).—Persia; Menjil, Safid-Rud, 27-1-19 (Dr. Buxton); Mesopotamia; Jebel Hamrin, N. E. of Baghdad, 26-9-18 Tak-i-Girreh, W. Persia, grassy ledges, limestone cliffs, 15-1-19 (Mr. Evans).
9. *Dociostaurus anatolicus* (Krauss).—Kazvin, 4,000 ft., 25-8—7-9-19 (Dr. Buxton).

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* See papers on Birds of N. W. Persia by P. A. Buxton published in this number, and Birds of Mesopotamia by C. B. Ticehurst which will shortly appear.

† Revue Russe d' Entomologie, xvi., 1916, p. 10.

‡ l. c. p. 8 (*Acrida robusta*).

10. *Dociostaurus genei* (Ocsk.).—Amara, 1—16-6-18 (Dr. Buxton); among vegetation in garden on Tigris below Amara, 3-6-18; garden above Amara, 15-6-18 (Mr. Evans).
11. *Pallasiella truchmana* (Fisch. Wald.).—Roadway through large marsh, 12 miles below Amara, 22-5-18 (Mr. Evans).
12. *Æolopus thalassinus*, Rossi.—Numerous specimens from Amara, Enzeli Baghdad, Kazvin.
13. *Æolopus strepens deserticola* (Uvarov)*.—Palm grove, Beit Na'ama, near Basrah, 8-4-19 (Mr. Evans). This desert subspecies of *A. strepens* (Latr.) was described by me from specimens taken in Eastern Transcaucasia and Transcaspia.
14. *Pachytylus danicus* (L.).—Amara, 11-11-18, 20-10-18 (Dr. Buxton); Chahala, Amara, grassy ground, 5-11-17; Masharra, Amara, among Acacia scrub, 17-8-18 (Mr. Evans). The dates of development of imago in Mesopotamia are quite different from those obtained in more northern localities and they seem to indicate that this species has here two generations in a year.
15. *Œdaleus senegalensis*, Krauss.—Enzeli, 7-6—10-7-19, vii., 19, common; Gilan, 14-61-9 (Dr. Buxton). As synonyms of this species are to be regarded:
    Œdaleus mlonkosiewitchi, Bolivar, Ann. Soc. Ent. Belge, 28, 1884, p. cv.—cvi.
    Œdaleus nigrofasciatus, Deg. var. c. Saussure, Addit. ad Prodr. Oed., p. 42.
16. *Œdaleus nigrofasciatus* (Deg.),—Kazvin, 7,000 ft., 26-8-19; Amara, 13—26-6-18 (Dr. Buxton); garden above Amara, 21-6-18; uncultivated land, right bank of Tigris, 8 miles above Amara, 10-6-18.
17. *Mioscirtus wagneri* (Ev.).—Tehran, 12-10-19; Amara, 15—28-6-18 (Dr. Buxton); on dry earthy places in garden on Tigris, Amara, 1-11-17 (Mr. Evans). Saussure's *Conozoa rogenhoferi* (Add. ad. Prodr. Oedip., p. 62, tab. 2, fig. 4, 4a, 4b, 4c) is evidently synonymous with Eversmann's species.
18. *Œdipoda schochi*, Sauss.—Kazvin, 5—7-9-19 (Dr. Buxton).
19. *Œdipoda gratiosa*, Serv.—Kazvin, 17-7—25-8-19 (Dr. Buxton).
20. *Acrotylus insubricus*, Scop.—Many specimens from Enzeli, Kazvin, Menjil, Baghdad and Amara.
21. *Helioscirtus moseri*, Sauss.—Mesopotamia; Jebel Hamrin, gravelly summit, 3-12-18 (Mr. Evans). The specimens are quite like those from Turkestan. I think that *H. moseri ab. pietschmanni*, described by N. Ikonnikov† from Mesopotamia is a mere colour form.
22. *Sphingonotus cœrulans*, L.—In very large numbers from Enzeli, Gilan Menjil, Kazvin, Baghdad, Amara. One specimen taken by Dr. Buxton at Tula Rud (Talysh) was the prey of a dragon-fly; Dr. Buxton gives the following note on this occasion: "I saw the Acridian fly up as I came along and the dragon-fly catch it securely in the air. Both were netted instantly and the Acridian was not hurt at all, so far as I could see. Both species were common. The Odonatan has been determined by K. J. Morton as *Orthetrum sabina*, Drury."
23. *Sphingonotus satrapes*, Sauss.—Amara, 26-6—4-7-18 (Dr Buxton). This large species of *Sphingonotus* has been known, so far, from the southern parts of Transcaucasia and Russian Turkestan; I know specimens (in the Tiflis Museum) from Tehran, but it is evidently distributed further west and southwards.

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* Described in "Entom. Monthly Magazine," 1921.

† Ann d k. k. Naturhist. Hofmus. Wien, xxvii, 1913, p. 391.

24. *Leptopternis gracilis* (Ev.).—Mesopotamia: Jebel Hamrin, N. E. of Baghdad 20-11-18 (Mr. Evans).

25. *Tmethis carinatus*, Fabr.—Khaniqin, R. Diala, 1-8-18 (Dr. Buxton) known from Egypt, Arabia and Palestine; I have seen specimens from N. W. Persia.

26. *Nocarodes serricollis*, Fisch. Wald.—Menjil, valley of Sufid-Rud, 3,000 ft. 24-4-19 (Dr. Buxton).

27. *Pyrgomorpha conica*, Oliv.—Baghdad, 7-10-17; Amara, 30-3—30-6-18 (Dr. Buxton); garden above Amara, 14-3-18 (Mr. Evans).

28. *Leptoscirtus evansi*, sp. n.

♂ : Subdepressus, rugulosus, ochraceus, nigro, rubro, rufo et albo punctatus ac variegatus, sparce pilosus; subtus albidus.

Antennæ caput cum pronoto unitis subæque longae; 8-articulatæ; articulo tertio longiore quam latiore; articulis 4-7 subæque longis ac latis; articulo octavo longissimo, præcedentibus six æquilongo, creviter incrassato, apice truncato. Facies parum oblique reclinata, albida, lata, subplana, punctis magnis impessis, hand numerosis. Costa frontalis inter antennas validissime compressa, lamellaris, angustissime lineari-sulcata, infra ocellum nulla; ocello magno, ovoideo. Tempora apicem vertici formantia, parum declinata, fere superiora, magna, trigonalia, marginibus calloso-elevatis, intus late sese contigua. Vertex valde impressum marginibus lateralibus in dimidia antica valde elevatis, postice subdepressis, dehinc elevatis introrsumque incurvis, carinis transversis, medio hand attingentibus, formantia; carina longitudinali mediana antice nulla, pone medio et in occipite parum distincta. Occiput callositas duos sat magnos rotundos, albos, ad angulum interno-posticum oculorum positos, duosque posticis majoribus, sed depressis, instructum. Oculi magni, valde globosi.

Pronoti prozona gibbulosa; tuberculis callosis six minutis ad marginem anticum, duosque sat magnis albidis in parte antica prozoni et quadris minoribus, subacuminatis, figuram trapezoideum formantibus in regionem sulsos transversos positis, instructa. Metazona planiuscula, callositas albidos duos, depressis, oblongis, in medio positis, instructa; margine postico lato rotundato. Carinæ laterales in prozona per tuberculis tres callossis magnis, in serie obliquo positis (duos ad marginem anteriorem positis et sese appropinquatis, unoque parum remoto, inter sulcos transversos posito) substitutæ; in metazona in dimidio postico tantum expressæ, callosæ, postrorsum sat valde divergentes. Carina mediana medio tantum parum perspicua, antice et postice obsoleta. Sulcum transversum secundum parum ponemedium situm in medio antrorsum parum angulato recurvum; sulcum primum per callositas obliquos interruptum. Lobi deflexi haud planæ, medio valde ac late impressæ, antrorsum augustatæ; angulo antico subrecto, tuberculo calloso magno oblongo instructo; angulo postico recto, vix calloso.

Prosternum antice valde laminato-elevatum. Spatium mesosternale longius quam latum, metasternale valde transversum.

Elytra angusta, apicem femorum posticorum attingentia in tertia parte apicali membranacea, rugulosa, tuberculis callosis albis oblongis in serie uno positis, instructa. Alæ cœrulescentes, elytrorum parum longioræ.

Femora antica parum incrassata, albida; tibiæ antice parum curvati, spinulis margine infero-externo duobus, infero-interno uno instructæ. Femora intermedia elongata, parum decurva, albescens, fusco fasciata. Femoras postica extus ochracea, maculis rubris irregularibus in area superno-media, nigrisque in area dicta et in margine inferiore areæ extermo-mediæ positis, ornata; intus albida. Tibiæ posticæ griseo-cœrulescentes, spinis margine externo quattuor, in margine interno duo instructæ; calcaria valde elongata, sat crassa, apice ipso levissime subarcuato, nigro; calcar supero-internum longissimus, calcaria supero-externa

ac infero-interna sese æquilonga et supero-interno parum breviora; calcar externo-infernum præcedentibus sat brevior, distincte decurvus. Tarsi postici articulo primo sat longo, secundo brevissimo, tertio præcedentibus simul sumptis æqualio, decurvo; unguiculi graciles, sat longi, decurvi; pulvilli dimidio unguiculorum æquantes.

	♀ (typus) mm.	♀ (cotypus) mm.
Long. corporis ..	11	17
,, pronoti	2	3
,, elytrorum ..	9	13
,, femori postici ..	6, 5	9

Hab.—Mesopotamia: Jebel Hamrin prope Baghdad, 13-11-18 (W. E. Evans leg).

Typus ♂ et cotypus ♀ in collectionem Musei Britannici positi; alii cotypi in collectionibus Musei Edinburgensis, Evansi et me a conservati.

I have been in doubt as to the genus to which this interesting insect belongs: in its general appearance it seems to be an *Oedipodid*, but the position and form of the tempora, which are most clearly contiguous and forming the extremity of the fastigium, indicates its place among *Pyrgomorphidæ*, near *Chrotogonus*. The nearest known thing is *Leptoscirtus angustus*, Blanch. (= *L. savignyi*, Sauss) and after a careful study of the unique specimen of the latter species in the British Museum, I came to the conclusion that my species is to be placed in the same genus. It is obvious, also, that Saussure was wrong in placing *Leptoscirtus* in *Oedipodidæ*, since the genotype of this genus is *L. angustus*—a Pyrgomorphid; on the other hand the remaining two species which are included in the genus *Leptoscirtus* by Saussure—*L. unguiculatus*, Sauss. and *L. aviculus*, Sauss., are doubtless Œdipodidæ and ought to be withdrawn from this genus. Thus, the genus *Leptoscirtus* (of Pyrgomorphidæ) includes in it two species only: *L. angustus*, Blanch, and *L. evansi*. * The genus itself is well characterised by the short fastigium of vertex, by the antennæ composed of 8-9 articles while the terminal article is very long and incrassate, and by long spurs of the hind tibiæ. The new species is quite easily separated from *L. angustus* by more markedly marginated tempora, by the characteristic callosities on head, pronotum and elytra, by the 8-jointed antennæ, &c.

This remarkable insect is truly desert in its habitation, being discovered by Mr. Evans on gravely slopes, where it ought to be exceedingly well protected by its coloration and habits.

28. *Tropidopola cylindrica*, Marsh.—Amara, 30-10—1-11-17; 10-4—2-5-18—Qalatsaleh, 6-1-18 (Dr. Buxton); grassy ground near Tigris, Amara, 31-10-17 (Mr. Evans).

29. *Derocorys gibbosa*, Fisch.-Wald.—River Tigris, 8 miles above Amara, uncultivated ground, 10-9-18 (Mr. Evans).—This species has been known so far only from Aralo-Caspian deserts.

30. *Acrydium ægyptium*, L.—Enzeli, 10.-4-19; Amara, 30-9—27-10-17 (Dr. Buxton); Masharra Canal, Amara, on willows, 5-9-18 (Mr. Evans).

31. *Schistocerca gregaria* (Forsk.) (=*peregrina*, Ol.)—Enzeli, 24-5-19, "migarnt?" (Dr. Buxton); courtyard, Beit Na'Ama Hospital, Basrah, 5-4-19. (Mr. Evans).—Mr. Evans remarks that "a flight of this species appeared at Basrah in April 1919." The supposition of Dr. Buxton that the Enzeli specimen belongs to a migrating swarm ought to be true, since this

* It is possible that some species of *Chrotogonus* with small number of joints of antennæ (*Ch. savignyi*, Burm., for instance) might be replaced in *Leptoscirtus*, but it can be done after study of specimens only.

locust is not known to have breeding places so far north: he informs me that the species was common at Enzeli at the end of May, and that drowned specimens were frequently washed up on the shore of the Caspian.

32. *Calliptamus italicus*, L.—Large number of specimens from different localities (Menjil, Kazvin, Baghdad, Amara, Mendeli).

33. *Thisocetrus littoralis*, Ramb.—Amara, 30-10-17, 15-6—1-11-18 (Dr. Buxton); among herbage near Tigris, Amara, 1-11-17 (Mr. Evans). The synonymy of this species is rather large, since I cannot agree with J. Bolivar*), who regards *Euprepocnemis charpentieri*, St., and *E. littoralis*, Ramb. as distinct species, the only difference being in the number of spines on the hind tibiæ, which is rather inconstant. As I have also had the opportunity of seeing some of Walker's types in the British Museum, I am able to add some new synonyms to the known ones and the chief synonyms of this species are as follows:—

1838. *Gryllus littoralis*, Rambur, Faune de l'Andal., p. 78, tab. vii, fig. 1-2.
1861. *Caloptenus similis*, Brunner-Wattenwyll, Verh. Z.-B. Gesellsch. Wien, xi, p. 224.
1870. *Cyrthacanthacris notata*, Walker, Catal. Derm. Salt. Brit. Museum, iii, p. 574.
1870. *Heteracris annulosa*, Walker, l. c. iv., pp. 673, 674, n. 41.
1871. *Acridium continuum*, Walker, l. c., v, Suppl., p. 61.
1873. *Euprepocnemis charpentieri*, Stal, Rec. Orth., 1, p. 75.

34. *Thisoecetrus buxtoni*, sp. n.

Th. littorali, Ramb, proximus, sed major et robustior.

Griseo-flavescens, haud maculatus. Antennæ supra flavæ, subtus nigrescentes. Caput grisescente-ochraceum, vitta angusta occipitale, postrorsum paulo dilatata, vittisque angustis verticalibus ad marginem inferiorem oculi usque ad clypeo perductis, nigris. Pronotum supra carina mediana angustissime nitido-nigra, in vitta castanea diluta inclusa; canthi laterales pronoti anguste nigri, inferius diluti; sulci transversi in lobis lateralibus ad partim nigri. Elytra testaceo-flavescentia, maculis nullis; parte anali pallidiora; basi ipso vitta curta obscura, valde diluta; venis principalibus basi ad partim nigrescentibus. Femora postica corpore concolores, ad carinam supero-externam internumque maculis tres nigris angustissimis; sulco inferno saguineo; lobis genicularibus vitta superna fusca punctoque uno nigro infra posito ornatis. Tibiæ posticæ flavicantes (in parte apicali vix rosescentes), fascies duabus nigris (prima per annulo angustissimo flavo in dua parte divisa) ornatæ; spinis flavis, apice ipso nigris. Tarsi postici flavi.

Antennæ medio paulo dilatatæ, 22-annulatæ, capite cum pronoto unitis valde longiores. Costa frontalis subgibbosa, verticem versus paulo angustata, irregulariter denseque impresso punctata. Vertex valde prominulum, planum, vix impressum, hand acute delineatum, rhomboidale, apice subrotundato, medio anguste carinulatum, carinula in occipite perducta; occiput subglobosum. Pronoti prozona a latere visa distincte gibbosa; metazona subcoriacea, angulo postico obtuso, rotundato; carina mediana acuta, elevata, per sulco typico recto, pone medium sito, profunde intersecta; sulcis duabus anterioribus hand profundis, curvatis; carinis lateralibus acutis, granulosis; lobis lateralibus coriaceis, sulcis duabus posterioribus valde impressis, margine antico vix sinuato, inferiore in medio obtusangulato, postico obliquo, subrecto, angulo postico valde obtuso, subrotundato. Tuberculum prosternale obtuse conicum, parum decurvum. Pedes omnes sat robusti, aroliis inter ungues sat magnis, rotundis; tibiæ posticæ

* Trab. Mus. Nac. Cienc. Natur. Madrid, Ser. Zool. N. 20, 1914, p. 23.

spinis extus intusque 9-10 armatæ. Lamina subgenitalis ♂ curta, apice obtusissima. Cerci ♂ compressi, laminæ subgenitali longiores, pone medio decurvi, validissime compressi et dilatati.

	♂ (typus). mm.	♀ (cotypus). mm.
Long. corporis ..	36	58
,, antennarum ..	14, 5	18
,, pronoti ..	8	11
,, elytrorum ..	33	45
,, femori postici ..	22, 5	32

Hab.—Mesopotamia: Amara 25-5-18 (Dr. Buxton leg.); Ibidem, 8-6-18 (Mr. Evans leg.)

Typus ♂ et cotypus ♀ in collectionem Musei Britannici; una ♀ cotypica in collectionem Musei Ediburgensis.

This splendid species is rather closely related to *Th. littoralis*, Ramb., as is obvious from the resemblance of the lamina subgenitalis and cerci of male, but it differs from the said species by the numerous characters—size, coloration, number of spines at the hind tibiæ, &c.

Th. buxtoni is the fourth known palearctic species of its genus. The specimens taken by Mr. Evans were captured among grass and camel-thorn at Masharra Canal, Amara.

35. *Thisoecetrus adspersus*, Redt.—Amara, 13—30-6-18 (Dr. Buxton); above Amara, on *Suæda*, 17-6-18; 12 miles below Amara, on *Acacia* in dry marsh, 12-9-18 (Mr. Evans).

36. *Thisoecetrus dorsatus*, F.-W.—Amara, 25—30-6-18; Kazvin, 19-7-19 (Dr. Buxton); among herbage, in garden above Amara, 21-6-18 (Mr. Evans).—J. Bolivar in his recent publication *) regards *Th. dorsatus* and *Th. pterostichus* F.-W. as two different species, but I have proved † by the study of the type specimens that the second name is a mere synonym.

For separating four palearctic species of the genus *Thisoecetrus* the following key may be of some use‡):—

1 (2). Pronotum rounded above, without lateral carinæ; median carina very feeble. Antennæ in ♂ 2½, in ♀ twice as long a. the head and pronotum taken togetber. Lamina subgenitalis ♂ is long and acute. Pronotum with a broad and sharply marked black stripe along the middle which does not proceed on the elytra. Elytra green with very few (or none at all) scattered small black points. Hind femora green, without any marking; hind tibiæ red, without black rings.

Th. dorsatus, F. W.

2 (1). Pronotum not rotundate above; sometimes with raised median carina; lateral carinæ well expressed. Antennæ in ♂ not more than 1½ times as long as the head and pronotum together, in ♀ as long as these, or a little longer. Lamina subgenitalis of male short and obtuse.

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*L. c. p. 23.

† Uqber die Orthopteren fauna Transcaspiens.—Horæ Soc. Entom. Ross., xl, N3, 1912.

‡ See also my paper on the Transcaspian Orthoptera (l. c., 33-34; fig. 3).

3 (4). Lamina subgenitalis ♂ obtuse, not marginated at the apex Anal area of the elytra infuscated at the base. Hind femora with sharp black markings on the upper side keel.

5 (6). Pronotum with sharply delimitated black stripe along the median carina. Elytra with numerous large black spots. Hind tibiæ sanguineous, with 15-17 spines on the outer side and about 13 on the inner side; hind tarsi rose.

Th. littoralis, Ramb.

6 (5). Pronotum with only median carina black, the median stripe being castaneous and not sharply defined. Elytra without any black spots or points. Hind tibiæ yellowish-grey, with 9-10 spines on both sides ; hind tarsi yellowish.

Th. buxtoni, Uvar.

4 (3). Lamina subgenitalis ♂ marginate at the apex. Anal area of elytra not infuscate ; elytra with numerous black spots. Hind femora with indistinct testaceous patterns on the outer side. Hind tibiæ rose, with 15 spines outwards and 12 inwards.

Th. adspersus, Redt.

37. *Euprepocnemis plorans* (Charp.)—Beit Na'ama near Basrah, 8-4-19 (Mr. Evans).—The following Walker's species are synonymous with *E. plorans* as I am convinced from the study of type specimens in the British Museum :

1870. *Cyrthacanthacris ornatipes*, Walk., Cat. Derm. Salt. Brit. Mus., iii, p. 575, N. 50.

1870. *Heteracris consobrina*, Walker, l. c., iv, pp. 673, 674, No. 40.

The Zoogeographical character of the Acridiodean fauna of Mesopotamia.

The records on the Mesopotamian Acridiodean fauna, previous to this one, are rather scarce, but, nevertheless, we can find in them some species not taken by Dr. Buxton and Mr. Evans.

Saussure in his "Prodronuss Œdipodiorum "(p. 149) quotes *Œdipoda miniatat*, Pall. var. *flava* from Baghdad, but the general character of distribution of this species leaves no doubt that either Saussure's determination of the specimen or its label is wrong. In the "Additamenta ad Prodromum" the said author described from Baghdad *Cobozoa rogenhaferi*, Sauss. (l. c., p. 62, tab. 2, fig. 4, 4*a*, 4*b*, 4*c*) which is synonymous with *Mioscirtus wagneri*, Ev., as I have stated above In 1913 N. Jkonnikov* published a list of Mesopotamian Acridiodea collected in 1910 by the Austrian Pietschmann's Expedition, and in this list 19 named species are recorded, ten of them being not found again by our collectors. In 1916† I had the opportunity of working out a collection of Orthoptera made by P. Nesterov on his journey along the Turko-Persian boundary, *i.e.*, partly in the Mesopotamian plains ; in this list ten species of Acridiodea are recorded, amongst them two not taken by Dr. Buxton and Mr. Evans. Thus, the number of species known from Mesopotamia is 43. If we compare this figure with the number of species known from Transcaspia which is about 70, we may conclude that the bulk of Mesopotamian fauna is already known and the list of known species may serve rather well the purpose of drawing some Zoogeographical conclusions.

* Ann. Naturhist. Hofmuseums Wien, xxvii, pp. 389-390.

† Bull d'u Musee du Caucase, x, 1916, pp. 181-194.

In the following list * the distribution of the Mesopotamian Acridiodea in the adjacent countries is shown, as follows :—

——	N. African deserts.	Meso-potamia.	Table-lands of Persia and Asia Minor.	Trans-caspia.
1. Paratettex meridionalis (Ramb.).	+	+	+	+
2. Acridalla robusta (Uvar.) ..	v.	+	+	+?
3. ,, miniata (Klug) ..	+	+	—	v.
4. ,, nasuta (L.)	+	+	+	+
5. Duroniella fracta (Krauss) ..	+	+	+	v.
6. Ochrilidia tibialis (Fieb.) ..	+	+	+	+
7. Stauroderus bicolor (Charp.) ..	—	+	+	+
8. Dociostaurus maroccanus (Thunb.)	+	+	+	+
9. Dociostaurus anatolicus (Krauss).	—	+	+	—
10. Dociostaurus genei (Ocsk.) ..	+	+	+	+
11. Pallasiella truchmana (F.-W.) ..	—	+	+	+
12. Œolopus thalassinus (Rossi) ..	+	+	+	+
13. ,, tamulus (F.)	—	+?	—	—
14. ,, strepens deserticola (Uvar.)	—	+	+	+
15. Pyrgodera armata, (F.-W.) ..	—	+	+	+
16. Pachytylus donieus (L.) ..	++		+	+
17. Œdaleus nigrofasciatus (D. G.) .	+	+	+	+
18. ,, senegalensis (Krauss) .	+	+	+	+
19. Mioscirtus wagneri (Ev.) ..	+	+	+	+
20. Œdipoda gratiosa, Ser.	+	+	+	+
21. ,, schochi, Sauss ..	—	+	+	—

Following abbreviations are used in the list: + means that the species is known from the country;—it is absent from it; v—it is replaced by closely related species or race.

——	N. African deserts.	Meso-potamia.	Table-lands of Persia and Asia Minor.	Trans-caspia.
22. Acrotylus insubricus, Scop. ..	+	+	+	+
23. Helioscirtus moseri, Sauss. ..	v.	+	+	+
24. Sphingonotus cœrulans (L.) ..	+	+	+	+
25. ,, satrapes, Sauss. ..	—	+	+	+
26. Leptopternis gracilis (Ev.) ..	—	+	+	+
27. Tmethis carinatus (F.)	—	+	+	—
28. ,, gibber (St.)	—	+	+	—
29. ,, cisti (F.)	+	+	v.	v.
30. Pyrgomorpha conica (Ol.) ..	+	+	+	+
31. Leptoscirtus evansi (Uvar.) ..	v.	+	—	—
32. Chrotogonus homalodema (Blan.)	+	+	v.?	v.
33. Tropidopola cylindrica (Marsh.)	+	+	+	+
34. Derocorys gibbosa (F.-W.) ..	v.	+	+	+
35. Acridium aegyptium (L.) ..	+	+	+	+
36. Schistocerca gregaria (Forsk.) .	+	+	+	+
37. Calliptamus italicus (L.) ..	+	+	+	+
38. Sphodromerus cœlosyriensis (Gig.-Tos) *	+	+	+	+
39. Thiscœcetrus littoralis (Ramb.) .	+	+	+	+
40. ,, buxtoni, (Uvar.) ..	—	+	—	—
41. ,, adspersus Redt. ..	+	+	+	+
42. ,, dorsatus (F.-W.) ..	—	+	+	+
43. Euprepocnemis plorans (Charp.)	—	+	+	+
Total ..	25+5v.	43	37+2v.	32+4v.

* *Calliptamus italicus*, L. ab. *carbonaria*, Uvar. (Revue Russesd' Entom., xiv 1914, p. 223); this synonymy will be explained fully in an other paper.

First of all it is evident from this table that as many as 28 out of 43 Mesopotamian Acridiodea are distributed all over the countries mentioned in the table; this group is composed partly of species very widely distributed generally, which are of small zoogeographical interest, but not less than 12 species are of peculiar interest, since their distribution is confined to the so called "desert belt" of the northern hemisphere; they are as follows:—

Acridella robusta.
Ochrilidia tibialis.
Dociostaurus maroccanus.
,, genei.
Mioscirtus wagneri.
Œdipoda gratiosa.
Helioscirtus moseri.
Tmethis cisti.
Chrotogonus homalodema.
Derocorys gibbosa.
Sphodromerus cœlosyriensis.
Thisoecetrus adspersus.

Some of these species are certainly to be found a little beyond the limits of the deserts, as for instance both species of *Dociostaurus* and *Œdipoda gratiosa*, but this fact may be easily explained by recent migration.

The remaining 13 species which are not distributed all over the "desert belt," setting aside *Thisoecetrus buxtoni*, which is described in this paper, and *Æolopus tamulus*, the occurrence of which in Mesopotamia is rather doubtful, may be divided into two distinct groups. One of these groups is composed of species common to Mesopotamia and the dry desert table-lands of Persia and Asia Minor, as follows:—

* Stauroderus bicolor.
Dociostaurus anatolicus.
* Pallasiella truchmana.
* Aeolopus strèpens deserticola.
* Pyrgodera armata.
Oedipoda schochi.
* Sphingonotus satrapes.
* Leplopternis gracilis.
Tmethis carinatus.
,, gibber.

Altogether ten species, six of them (marked with an asterisk) penetrating also into the Transcaspian plains. A careful study of these species and their relatives shows us most clearly that they all (except *Stauroderus bicolor* which is dealt with later on) doubtless originated on the Iranian or Armenian table-lands and migrated from there into the adjacent Mesopotamian and Aralo-Caspian plains. As for *Stauroderus bicolor* which is of rather northern origin, it is evident that it found its way to Mesopotamia through the mountains of the Caucasus and Transcaucasia entering the plains along the rivers.

There is, lastly, only one species of Acridiodea in Mesopotamia belonging to the second group which is not to be found anywhere else, while its very near relatives are known from Egypt; it is described in this paper as *Leptoscirtus evansi*. I think that its small size and exceedingly good protective coloration account for the fact that it is not known as yet from Persia, where it ought also to occur.

Thus the Acridiodean fauna of Mesopotamia may be regarded as a true eremian fauna of the great desert belt, being under strong influence of the fauna which originated on the dry table-lands of Persia and of inner Asia Minor.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, JULY 31, 1921.

ANNOTATED LISTS OF ACULEATE HYMENOPTERA (EXCEPT HETEROGYNA) AND CHRYSIDS RECENTLY COLLECTED IN MESOPOTAMIA AND NORTH-WEST PERSIA.

BY

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(FORMERLY PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF LONDON.)

(*With four Text Figures.*)

The greater part of the specimens recorded in these Lists—about three-quarters of the whole number—were taken by Captain P. A. Buxton (then of the Royal Army Medical Corps) either in Mesopotamia in 1918, or in N. W. Persia (near the South end of the Caspian Sea) in the following year. Together with these, and distinguished from them by being placed between square brackets [. . . . .], are included some captures made during the same period by two other officers of the R. A. M. C., namely, Captain W. Edgar Evans and Lieut. P. H. Harwood, the latter of whom collected in Mesopotamia only, and the former (partly in company with Captain Buxton) both in Mesopotamia and Persia. All records to which no statement to the contrary is added, may be assumed to have reference to specimens taken by Captain Buxton; and in these cases I have generally given the *day* and *month* of capture, but have thought it unnecessary to add the year, as this may always be inferred from the locality cited —1918 if the locality be Mesopotamian, and 1919 if it be Persian. (The letter (M.) attached to the name of a place indicates that it is in Mesopotamia, and similarly the letter (P.) that it is in North-West Persia.)

Captain Buxton forwarded to me all the specimens taken by him, a few at a time, as soon as possible after capture so that I could examine them while still comparatively fresh, and they have been in my hands ever since. These, therefore, I have been able to study at my leisure, and revise from time to time my first provisional determinations of them. Those which I received from my other correspondents were returned to the captors (named or unnamed) as soon as I had taken note of them, but I have lately examined afresh some of those taken by Captain Evans, and confirmed or corrected my first impressions about them. I understand that I have now seen nearly all his captures, and the rest are probably all duplicates of species already included in my Lists. I am much obliged to Captain Evans's father, Mr. W. Evans, F.R.S.E., etc., for communicating with me on this subject, and forwarding to me the specimens. Although the collection is small as compared with Captain Buxton's, it contains several insects, not included in the latter, which have especially interested me. Lieut. Harwood took only a very few Aculeata, but I have to thank him also for enabling me to make some welcome additions to the Lists. I should add that all my correspondents were mainly interested in other orders, and consequently that Hymenopterists should be grateful to them for sparing some of their valuable time towards the advancement of knowledge in a subject other than their own. So far as I know, only a few Russian Hymenopterists have collected in Transcaspia, and still fewer in Mesopotamia. In both these countries the Hymenopterous fauna appears to be almost exclusively Palaerctic. That of N. W. Persia seems, if one may judge such matters from the evidence of a single year's collecting there, to be practically European, a large proportion of the species occurring even in England, and most of them in Central Europe and the Balkan Peninsula. That of Mesopotamia has a more Southern character. A good many of its species occur, to my knowledge, in Egypt, and others are pretty widely distributed round the Mediterranean. But, except *Polistes hebræus* and *Xycolopa fenestrata*, I know of none, which can be thought to have reached

Mesopotamia by extending their range from Oriental centres of distribution, and both these are quite likely to have been introduced into the country—accidentally of course—by importation, in ships or otherwise. I have ventured to describe a few forms as new, but only because, being unable to recognize them in descriptions previously published, I could deal with them in no other way without violating a principle, which I think is sound—*viz.* that it is better to be the author of a "Synonym" than of a "Homonym." The former can do no great harm, but the latter remains a perpetual cause of confusion to future workers. Yet, no doubt, I must have some times committed both these offences unwittingly, for though I have carefully studied such descriptions as I could meet with—especially those of Morawitz in *Hor. Ent. Soc. Ross.*, *Fedtschenko's Reise*, etc., for Persian forms, and of Klug in *Symb. Phys.* for Mesopotamian—I have not had access, unfortunately, to any of their "Types." Nor have I had the advantage of such help as has been kindly given me on previous occasions by many of my foreign correspondents, except in one case,—Herr Alfken having been so good as to examine and give me his opinion about several specimens of the Genera *Hylæus* (=*Prosopis*) and *Halictus*. Consequently I have had to trust far more than pleases me to my own judgment in deciding on determinations of insects that were new to me. I need hardly say, that, besides my own collections made in Egypt, Syria, etc., I have also studied with a view to this paper the "E. Saunders" and other collections in the Natural History Museum; but these unfortunately contain very few specimens of either Transcaspian or Mesopotamian Aculeates, and even of these few most are either nameless or named doubtfully, and perhaps in error. I should mention, however, that some of Captain Buxton's earlier "sendings" reached me while Mr. R. E. Turner was still working in the Museum, and that I was able to obtain his valuable assistance in clearing up some of the questions about which I was in doubt.

I should have been glad, if it had been possible, to make this paper more attractive by adding to it something about the "topographical" characters of the localities mentioned in it—something more than their bare names! But I understand that such subjects will be discussed in two* other papers now being prepared for publication in this Journal, and that each will be accompanied by a Map, shewing the exact situation of such places in either of the countries dealt with as are mentioned in these Lists.

I have only to add that the Text-figures given in them to illustrate structural details, except Fig. 4, were either drawn from the objects with a "Wollaston Prism," or traced from their images thrown on the focussing screen of a Photomicrographic Camera, so that, though I am no artist in draughtmanship, I believe that they are correct as to measurements, etc., in proportion of course to their various magnifications.

List 1. Fossores.

1. *Apterogyna Olivieri*, Latr.—♀ "desert near Amara" (M), "running rapidly on the bare earth," 8th September 1918. [Another ♀ "on Tamarisk" 14th October 1918.—Captain Evans.]
2. *Mutilla* (*Ephutomma*) *Sanguinicollis*, Kl.—13 ♂ ♂ Amara (M), 28th May—2-19th June, 16-24th September [Also 2 ♂ ♂ "at light" at or near Amara (M) 6, 12th August—Captain Evans].

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* (1) Birds of N.-W. Persia by P. A. Buxton appearing in this number.
(2) Mammals of Mesopotamia by R. E. Cheesman, Vol. 27, No. 2

I have little doubt that this is the true *Sanguinicollis* Kl. Possibly *continua*;F. may be its ♀, in which case the Fabrician name would have priority.

3. *Mutilla* (*Myrmosa*) *erythrocephala*, Latr.—1 ♀ Khaniqin (M), 1st August.

4. *Mutilla catanensis*, Rossi.—1 ♀, Baquba (M), 27th July.
1 ♀, Baghdad (M), 10th September.
[1 ♀, at or near Amara (M), 7th September 1918—Captain Evans].

5. *Mutilla chrysophthalma* Kl.—4 ♂ ♂, Amara (M), 20th June, 17th July, 7th September. [1 ♂ at or near Amara (M), 7th September 1918—Captain Evans].

There is some mystery about this and the last species. It will be noticed that both my correspondents found only ♂ ♂ of *chrysophthalma* and only ♀ ♀ of *catanensis*. Furthermore, Captain Evans took his *chrysophthalma* ♂ and, *catanensis* ♀ together, and, at the time, was under the impression that they were paired, or on the point of pairing, though they were not actually paired when he took them out of the net!

It seems, however, to be well established, that the proper ♂ of *catanensis* is *floralis*, Klug, a form which, though evidently akin to *chrysophthalma*, is superficially at least, quite unlike it. Nor are the ♀ ♀ of *catanensis* and *chrysophthalma* so much alike that there can be any difficulty in distinguishing them. And in the Natural History Museum at South Kensington I find (*a*) a specimen of *floralis actually paired with* a ♀ of *catanensis*, and (*b*) a ♂ like those from Amara similarly *actually paired with* a ♀ of *chrysophthalma*, both these pairs having been taken on the same day and at the same place—namely, on April 14th, 1895, at Aden, by Colonel Yerbury.

This Amara ♂, which I suppose to be the proper mate not of *catanensis* ♀, but of *chrysophthalma*, Klug, seems to be undescribed. So far as actual "structure" is concerned it appears to me to have all the most characteristic features enumerated by Andrê (*Species* VIII, p. 109) in his very complete and satisfactory description of *catanensis* ♂ (=*floralis*). Nevertheless the two forms are separable at a glance, though their differences are almost entirely matters of coloration and pilosity. Thus in *catanensis* (*floralis*) the wings are entirely fuscous; the thorax is largely red; the pilosity is mostly yellowish, not strongly contrasting with the red colour of the abdomen, so that Andrê describes the second and following segments, as uniformly clothed with "pubescence d'un ferrugineux dorè, sans bande de pubescence blanche." In *chrysophthalma* on the contrary the bases of the wings are quite clear and colourless; the thorax is entirely black; and the whole pilosity of the insect is pure white, forming perfectly distinct and well defined silvery fasciæ across the base and apex of the 2nd segment and the apices only of the three following segments (only after segments 5 can it be described as clothing the integument uniformly, without distinct apical bands")

6. *Mutilla dalmatica* Andrê (?).—This species was not met with by Captain Buxton, but I have been kindly presented by Lieut. Harwood with two ♀ ♀ and a ♂ which apparently belong to it. He took them with several other specimens of both sexes near Baghdad in October 1918.

The ♂ seems to be undescribed. It is much smaller than *chrysophthalma*, but otherwise very like it, having similar pilosity, (though the abdominal fasciæ are somewhat less conspicuous) and wings with clear hyaline bases. But the tuberculation of the scutellum is merely rounded, not acutely conical. And only the two first segments of the abdomen are red, the rest of it, as well as the whole head and thorax being black. (Long. about 10 mm. Exp. alar. 16 mm.)

7. *Mutilla littoralis*, Petagn.—Var *grisescens*, September.
1 ♂, Amara, 27th October 1918.

8. *Mutilla rufipes*, F.—Var. *ciliata*, Pz. 1 ♂, Amara, 17th June, 1 ♂, Shahroban (M), 31st July.
Var. *platiensis*, Dest. 1 ♂ Qazvin (P), 17th July.
9. *Mutilla* (*Dasylabris*) *maura*, L.—2 ♂ ♂ (Var. *arenaria*, F) Talysh (P), 10th July.
1 ♀, Menjil, 29th March.
[1 ♀ on *Tamarix* 5 miles above Amara (M), 14th October 1918—Captain Evans].
10. *Myzine arabica*, Guer.—(?) 1 ♂, Baquba (M), 27th July.
11. *Myzine fasciculata*, E. Saund.—(?) 1 ♂, Qazvin (P), 17th July.

I have done my best to identify these ♂ ♂ of *Myzine*, but I feel very little confidence that I have named them rightly.

12. *Scolia* (*Triscolia*) *hæmorrhoidalis*, F.—3 ♂ ♂ Talish (P), 10th July, 2 ♀ ♀ Astara (P), 2nd July, 3 ♀ ♀ Enzeli, (P), 14-26th June, 1st July; 4 ♀ ♀ Amara (M), May.
[1 ♂, 1 ♀ "Common on Hollyhocks, etc." Beit Na'ama, Basrah (M), 27th and 31st March 1919—Captain Evans.]

The ♂ ♂ from Persia are very unlike normal South European specimens. Their pilosity is much paler, that on the thorax quite grey, and the yellow markings of the abdomen are singularly pale—very large and confluent, so that they appear rather as bands than as pairs of spots; and in all the specimens they occur not only on the 2nd and 3rd tergites, but on the 4th also. The ♂ from Beit Na'ama has no such peculiarities, and all the ♀ ♀ from both districts are quite normal.

13. *Scolia* (*Discolia*) *infuscata*, Kl.—9 ♂ ♂, 3 ♀ ♀, Amara (M), 4th May to 31st October.
1 ♂, 1 ♀, Baghdad (M), 26th July; 1 ♀, Khaniqin (M), 31st July.
[5 ♂ ♂, 2 ♀ ♀ at or near Amara (M) 2nd May, 20th June, 17th and 27th August 1918—Captain Evans.]
[2 ♂ ♂, Tanooma (M). No date stated. (Lieut. Harwood.)]
14. *Scolia* (*Discolia*) *maura*, Kl.—1 ♂, Qazvin (P), 17th July.
15. *Scolia* (*Discolia*) 4 *punctata*, F.—1 ♀, Qazvin (P), 24th July.
16. *Scolia* (*Discolia*) *hirta*, Schrk.—1 ♂, Qazvin (P), 20th September.
17. *Elis* (*Triclis*) 6-*maculata*, F.—8 ♂ ♂, 3 ♀ ♀ Talish (P), 10th July.
18. *Elis* (*Dielis*) *marginella* Kl.—1 ♂, Baquba (M), 27th July.
19. *Elis* (*Dielis*) *eriophora*, Kl.—1 ♀, Baquba (M), 30th July.

This ♀ is described and figured by Kl. (*vide* Pl. XXVII of *Symb. Phys.* Fig. 6) under the name *vestita*. But he suggests that it is the ♀ of "the preceding species," *i.e.*, of *eriophora* (Fig. 5 on the same Plate, a ♂.) I have taken both forms together in Egypt, and have no doubt that they are, as he thought, conspecific. In v. dalla Torre's *Catalogus*, however, *eriophora* is treated as a synonym of *albicollis* Chr., while *vestita* is referred to another species which he calls "*collaris* (Fabr.), Gmel."

I find it difficult to believe that this large and handsome *Dielis* can have anything to do with Fabricius's *collaris*, which is described by its author as a *Tiphia* of the size of *femorata* (!) It may, however, be identical with either or both of two other Fabrician species, namely, *T. nigra* and *T. thoracica*. Of these *T. nigra* was the first to be described, and on the whole seems to match the better of the two with Klug's figure and diagnosis. (The pilosity of the thorax

is called 'red' in *nigra*, 'cinereous' in *thoracica*. Still the 'type' of the latter may have been a faded specimen.) The *Catalogus* sinks both *nigra*, F., and *thoracica*, F., as synonyms of *albicollis*, Chr., and, as aforesaid, makes *eriophora*, Kl. a var. of the same species. All this appears to me to be rather conjectural! Nothing is known as to the 'habitat' of either *albicollis*, or *nigra*, and that given by Fabricius for *thoracica* is "the coasts of Malabar." Personally I am inclined to await further evidence, and in the meantime acquiesce in *eriophora*, Kl., as the oldest name which is known for certain to have been applied to the Egyptian and Mesopotamian species. A ♀ very like that of *eriophora* (="*vestita*") is common in Algeria, but its ♂ seems to be always black-bodied, whereas all my Egyptian *eriophora* ♂♂ are coloured as in Klug's figure (*i.e.*, with the abdomen for the most part orange.) This Algerian form was recorded by Saunders in Tr. Ent. Soc., Lond., 1901, and referred to *thoracica*, F. Whether they are really the Fabrician *thoracica*, and whether or not they are identical with *eriophora*, Kl., seem to me questions deserving further investigation.

20. *Tiphia femorata*, F.—1 ♂, Enzeli, 28th May.
21. *Psammochares* (=*Pompilus auctt.*) *melas*, Kl.—1 ♀, Amara (M), 20th September.
22. *Psammochares cingulatus*, Kl.—1 ♀, Amara (M), 10th June.
23. *Psammochares rutilus*, Kl.—1 ♂, Amara (M), 10th June.
[1 ♂, Tanooma (M), October 1918—Lieut. Harwood.]
24. *Psammochares modestus*, Kl.—1 ♂, Amara (M). 10th June, 2 ♀♀, Amara (M), 13th June and 19th July.

The ♀♀ agree with that described and figured in *Symb. Phys.* from Ambukohl in all important characters (size, general coloration, neuration and clouding of wings, unidentate claws, etc.), but the propodeum and posterior coxae are darker, (not bright red throughout like the mesonotum and scutellum,) but only a little rufescent in parts, and elsewhere black like the breast and abdomen.

The ♂ seems to be still undescribed. The present specimen was taken three days before one of the ♀♀, and in the same locality. It is coloured much like the ♀, except that the propodeum and coxæ are black entirely, the last dorsal segment of the abdomen white and fringed with short silvery hairs at the apex, the last ventral segment testaceous, the head black (except the mandibles, sides of the face, and orbits of the eyes narrowly, these parts remaining red), and the greater part of the antennæ (from about the 4th joint to the apex) black. The body is clothed (much as in *plumbeus*) with a very short whitish pubescence only visible in certain lights. This particular specimen is much smaller than either of the ♀♀, (only about 6 mm. long.) but it is well known that individual specimens of *Psammocharidæ*—♂♂ especially—often vary much in size. (In this specimen the abdomen is very strongly compressed laterally—perhaps this is accidental, but it may possibly be a real character, so I mention it.)

25. *Psammochares* (*Platyderes*) *orchesicus*, Kohl.—1 ♀, Amara (M), 19th July.
26. *Psammochares* (*Platyderes*) *denticulatus*, Tasch.—1 ♀, Amara (M), 1st June.

I took a very similar specimen on Roda Island in the Nile, near Cairo, in 1896.

[27. *Psammochares* (*Anoplius*) *luctigerus*, Costa (?)—1 ♀, "near Ruz, N. E. of Baghdad," 24th November 1918.—Captain Evans.

This ♀ is an *Anoplius* according to Sustera's tabulation of the *Psammocharidæ* (1912). It is entirely black with dark wings, much larger than *nigerrimus* (which is the nearest to it among British species). The propodeum has no remarkable features, and is almost without sculpture of any kind. All the unguiculi are toothed pretty strongly near their bases. The spines of the tarsal pecten are sharp and long, on which account I suspect it to be *luctigerus*, but I know that species only from Costa's description.]

28. *Cryptocheilus* (=*Salius*, F) *bicolor*, F.—2 ♀♀, Amara (M), 19th June 7th September.
[2 ♀♀, Amara, 27th and 29th August 1918.—Captain Evans.]

29. *Sceliphron* (=*Pelopoeus*, Latr.) *caucasicum*, André—1 ♀, Kurna (M), 20th May. [1 ♀ Amara (M), 27th August 1918—Captain Evans].

30. *Sceliphron tubifex*, Latr.—
[1 specimen taken near Basrah (M) in October 1918 by Lieut. Harwood.]

I forgot to take note of the sex before returning this insect to its captor. But I observed that the scapes of its antennæ were partly yellow. In this species they seem to be normally immaculate, but in *destillatorium*, Ill. (though otherwise a less highly coloured insect), I have always found them entirely yellow!

31. *Ampulex assimilis*, Kohl.—1 ♂, Amara (M), 19th June. [1 ♀, Lieut. Harwood. From Mesopotamia, but I have no note of the precise locality, nor of the date of capture].

Hitherto only ♀♀ of this species seem to have occurred. Kohl described it from specimens in the Vienna Museum, giving "Guinea" as their locality, but mentions that one of them came "angeblich von Bagdad." It is interesting to have confirmation of the latter record, which without such confirmation might reasonably be thought open to doubt.

Until I saw Lieut. Harwood's ♀ and identified it with the help of Kohl's monograph of the genus as *assimilis*, I thought that I had already determined the ♂ for certain as another of that author's new spp. namely, *gratiosa*. The latter, like *assimilis*, was described from Guinea, and also in one sex only—in this case the ♂! The characters of Captain Buxton's insect almost without exception are absolutely identical with those described by Kohl for *gratiosa* ♂: in fact the only points I can discover which might conceivably distinguish the two forms are as follows.

(*a*) The eyes of *assimilis* may perhaps be slightly nearer together on the vertex, the distance between them being only two-thirds of the length of the 3rd antenual joint, whereas in *gratiosa* it is simply called "hardly as long."

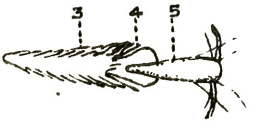


Fig. 1. 3 *Last Joints of Hind Tarsi in A. Assimilis* ♂.

(*b*) The fourth joint of the hind tarsi (Figure 1) is certainly not above half as long as either the fifth joint or the third (it is exactly as Kohl describes it in *assimilis* ♀!) But of gratiosa ♂ he says merely, that the fourth joint is "visibly" shorter than the third, at the same time calling it "about half as long as the fifth." From this it seems a probable inference that in *gratiosa* the 3rd and 4th tarsal joints differ less than in *assimilis*.

(*c*) Except a very slight ill defined cloud, filling the radial cell, but hardly extending beyond it, and another (still smaller) in the angle contained between the median vein and the brachial nerve (*n. transversus ordinarius*), I can find nothing in the wings of *assimilis* corresponding to the two feeble dark 'Querbinden' mentioned in the diagnosis of *gratiosa*.

(*d*) The mandibles of *assimilis*—at least in the specimen before me—are strongly rufescent. If this character occurs also in *gratiosa*, the author has not mentioned it.

An actual comparison of Captain Buxton's specimen with the Type of *gratiosa* might perhaps reveal other differences, or on the contrary might show that those above mentioned are unsubstantial.

In the meantime I will only add that in *assimilis* ♂, as in *gratiosa*, the 1st cubital nerve is completely aborted, but that in Lieut. Harwood's ♀ it is present though obsolescent. This character, however, is expressly stated by Kohl to be variable in ♀ ♀ of *assimilis*, and also in those of other *Ampulex* spp.

32. [*Chlorion* (=*Sphex auctt.*) *Semenowi*, Morawitz.—1 ♀, Ruz Camp, N. E. of Baghdad, 15th November Captain Evans.]

I believe I have determined this splendid insect correctly, though I have not seen the Type, and have had to depend solely on the author's description of it *Hor. Ent. Soc. Ross.*, XXIV, 1890. This description appeared too late for Kohl to introduce the species into his Tables of *Sphex* L. published in the same year. But he reproduces the original description later on in his Monograph (No. 174 [p. 253] p. 451, Ann. Nat. Hofm. V.)

33. *Chlorion* (*Palmodes*) *melanarius*, Mocs.—1 ♀, Shahroban (M), 31st July.
34. *Chlorion* (*Palmodes*) *argyrius*, Brull.—[1 ♀ "Garden below Amara," 5th June 1918—Captain Evans].
35. *Sphex* (=*Ammophila*, K.) *occipitalis*, Morawitz.—2 ♂ ♂, Amara (M) 28th May.
1 ♀, Amara (M), 4th December 1917.
[1 ♂, 26th April, 1 ♀, 10th September 1918 "at or near Amara"—Captain Evans.]
36. *Sphex* (*Eremochares*) *dives*, Brull.—2 ♀ ♀, Amara (M), 28th May
[1 ♂ "5 miles below Amara," 29th August—Captain Evans.]
37. *Philanthus triangulum*, F.—1 ♂, 1 ♀, Talish (P), 10th June; 3 ♀ ♀, Enzeli (P), 14th June.
38. *Philanthus coarctatus*, Spin.—1 ♂, Baquba (M), 27th July.
39. *Cerceris emarginata*, Pz.—1 ♂, Baquba (M), 27th July; 1 ♀, Amara (M), November, 5 ♂ ♂, Qazvin (P), 17th to 24th July.
[1 ♀, "about mud wall, garden or Tigris, above Amara," 16th September—Captain Evans.]
40. *Cerceris subimpressa*, Schlett.—3 ♂ ♂, Amara (M), 14 to 28th May; 1 ♀, Amara (M), 8th May.
41. *Cerceris insignis*, Klug.—1 ♂, Amara (M), 28th May.
42. *Cerceris bupresticida*, Duf.—2 ♂ ♂, Baquba (M), 27th July.
43. *Cerceris spinipectus*, Sm. (=*prisca*, Schlett.) 5 ♂ ♂, Amara (M), 28th May to 26th June; 1 ♀, Amara (M), 13th June.
44. *Cerceris lutea*, Tasch.—4 ♂ ♂, Amara (M), 28th May to 14th June.

This and the last species seem to me best separable by the sculpture of the propodeum, its "cordiform area" being quite polished and shining in *lutea*, but dull in *spinipectus*. (The coloration of the thorax appears to be variable on both forms, the mesonotum being sometimes quite black, and sometimes chiefly yellow. The latter is the case with all the Mesopotamian specimens of both species now before me. Of my own captures in Egypt and Palestine all which I take to be *spinipectus* have the mesonotum black, and all but one ♂ of *lutea* yellow!)

45. *Cerceris dacica*, Schlett. (?) var.—1 ♀, Qazvin (P), 17th July.

A very highly coloured form, nearly answering to Schletterer's description of his var. *magnifica*. But the apical segment is entirely black.

46. *Cerceris*, sp ?—1 ♂, Qazvin, 17th July.

Possibly a ♂ of *capitata*, Sm. But the abdominal fasciæ are very wide, and not, as in *capitata* ♀, "subinterrupted." A ♂ sent to me from Madrid by Sn. Mercet as *capitata* differs from the present specimen only in being larger with narrower abdominal bands (none of them "subinterrupted"!) and smaller spots of yellow on the scutellum.

47. *Cerceris annexa*, Kohl.—1 ♂, 2 ♀ ♀, Amara (M), 9th September; 2 ♂ ♂, Fao (M), 10th August; 1 ♂, Khaniqin (M), 1st August.

48. *Nysson rufus*, Handl.—1 ♂, Amara (M), 25th June; 4 ♀ ♀, Amara (M), 14-25th June, 18th July.

49. *Sphecius uljanini*, Rad. (?)—1 ♂, Qazvin (P), 17th July.

I think this must be the ♂ of *uljanini*, and believe it has never yet been described.

It resembles *antennatus*, *laniger*, etc. in the form of its paradoxical intermediate metatarsi. The specimen before me, which is the only one I have seen, has unfortunately lost all but a few basal joints of its antennæ, but they seem to have been testaceous, except the scapes, which are yellow with *only their basal halves* blackened behind. The "pictura pallida" is of a light sulphur-yellow, and exceedingly copious. It occupies the whole face below the antennæ, and is continued upwards, along the inner orbits of the eyes, nearly to the level of the anterior ocellus; about half way between the upper end of each of these orbital yellow vittæ and the ocellus aforesaid there is a very minute and inconspicuous yellow spot. The edge of the pronotum is also yellow; as are the humeral tubercles; a square spot immediately behind them on the mesopleures; the front half of the tegulæ (their posterior half being rather rufescent); the *sides of the mesonotum* (N.B.) very widely, these being occupied by a large yellow longitudinal vitta, which runs along the tegulæ and is dilated downwards till it reaches the tubercles and fills the whole angle which separates them from the tegulæ; *a large oval mark on the scutellum*; nearly the whole of the anterior legs, (even the coxæ of the 1st pair are yellow in front!); the tarsi, tibiæ, and nearly half the femora of the hind legs; a large triangular spot occupying each side of the 1st segment; and very wide undulated subapical fasciæ on each of those following (the extreme actual apices of the segments are dully rufescent!). These fasciae (except that on the apical segment) are to a certain extent continued on the underside of the abdomen forming triangular or sub-triangular maculæ on the sides of each ventral-plate. The pilosity of the head and thorax is whitish. The neuration of the wings pale reddish-brown.

50. *Stizus tridens*, F.—1 ♂, Talish (P), 10th July.

51. *Stizus cyanescens*, Rad.—2 ♂ ♂, Amara (M), 10th July; Amara (M), 12th September. 2 ♀ ♀, Amara (M), September.

52. *Stizus bizonatus*, Klug.—8 ♀ ♀, Amara (M), 8th June to 19th July.

53. *Stizus ruficornis*, F.—1 ♂, Talish (P), 10th July; 1 ♀, Enzeli, 30th June.

54. *Bembex bidentata*, v. d. Lind.—5 ♂ ♂, 2 ♀ ♀, Talish (P), 10th July.

55. *Bembex bicolor*, Rad.—4 ♂ ♂, 1 ♀, Amara (M), 9-17th September.

56. *Bembex oculata*, Latr.—2 ♀ ♀, Enzeli (P), 6-26th June.

57. *Bembex mediterranea*, Handl.—9 ♂ ♂, 5 ♀ ♀, Enzeli (P), 6th June.

58. *Palarus fabius*, Nurse.—2 ♂ ♂, 2 ♀ ♀, Amara (M), 9th September.

These were taken on *Zizyphus*. Mr. R. E. Turner helped me to determine them by comparison with a specimen presented by Col. Nurse to the Natural History Museum, S. Kensington. Though hitherto this species seems to be recorded only from India, Mr. Turner considers the genus to be really part of the Palearctic and Ethiopian fauna, and not "Oriental" (cf. his "Remarks on the genus Palarus" in *Ann.* and *Mag. Nat. Hist.*, May 1911).

59. *Liris hæmorrhoidalis*, F.—1 ♀, Amara (M), 5th October [Taken also in both sexes by Lieut. Harwood.]

60. *Notogonia sculpturata*, Kohl.—3 ♂♂, Amara (M), 17th September on *Zizyphus*; 1 ♀, Resht (P), 18th February
61. *Notogonia subtessellata*, Smith.—1 ♂, Amara (M), 17th September; 2 ♀♀, Amara (M), 23rd March and 23rd Oct.
62. *Notogonia nigrita*, Lep.—1 ♀ taken by Lieut. Harwood.
63. *Tachytes dichroa*, Smith.—1 ♂, 5 ♀♀, Amara (M), 12th June to 19th July.
64. *Tachytes freygessneri*, Kohl.—1 ♂, Amara (M), 17th September.
65. *Tachytes tricolor*, F.—1 ♂, Amara (M), 15th June; 1 ♀, Amara (M), 26th June.

The ♀ seems to me certainly *tricolor* F. according to Kohl's diagnosis in his *Gattungen* (etc.) *der Larriden*; and I think the ♂ belongs to it, though its hind femora are largely black.

66. *Tachytes ambidens*, Kohl.—6 ♂♂, Amara (M), June 14-21, some (perhaps all?) visiting Acacia; 2 ♂♂, Amara, July 20th; 1 ♂, Amara (visiting *Zizyphus*), September 17th. *Ambidens* ♂ was described from Sarepta, I have not seen Kohl's Type, but have a ♀ named by that author from Biskra, and a ♂ which, I think belongs to it. Captain Buxton's Mesopotamian specimens are all much smaller than the latter, but I see no other difference between them and my own ♂, and both have certainly the chief characteristic of *ambidens* ♂—namely an excavation near the base of the front femur somewhat like that of a *Tachysphex* ♂. The pygidium in all of them is pilose, as in normal *Tachytes* spp.; and the distance between their eyes on the vertex, and the measurements of their antennal joints seem to agree with Kohl's statements as to his ♂ from Sarepta.
67. *Tachysphex græcus*, Kohl.—1 ♂, Amara (M), June 14th.
68. *Oxybelus lamellatus*, Oliv.—14 ♂♂, 4 ♂♂, Amara (M), September, mostly on *Zizyphus*; 1 ♀, Baghdad (M), 10th September.
69. *Oxybelus* 14—*notatus*, Jur.—3 ♂♂, Qazvin (P), 17th to 24th July.
70. *Oxybelus pugnax*, Oliv.—2 ♂♂, Amara (M), 17th September.
71. *Oxybelus*, sp. ?—2 ♂♂, Amara, 9th September.

A very small species, with whitish, translucent, straight and parallel-sided mucro, red mandibles, and eburneous (nearly confluent) lateral markings on segments 1 and 2 of the abdomen. (I have something very like it, unnamed from Egypt.)

72. *Crabro* (*Entomognathus*) sp ? Qazvin (P), 17th July.

The specimen is broken, but I think it is a variety of *C. brevis* which has been recorded by Kohl from Egypt, with the collar, scutellum, knees, tibiæ, and tarsi yellow. The pygidium is of the normal width, so it is not *schmiedeknechti*, Kohl.

List 2. Bees.

1. *Colletes nanus*, Friese—2 ♀♀, Amara (M), 28th May.
2. *Hylœus* damascenus*, Magretti.—2 ♀♀, Shahroban (M), 31st July.
3. *Hylœus scutellaris*, Morawitz.—1 ♂ and 1 ♀, Qazvin (P), 17th July.

The ♀ seems to me to have all the characters enumerated in Morawitz's description of *scutellaris* ♀. It is however a trifle smaller (about 6 mm. long, not 7,) and in addition to the yellow markings there mentioned has also the lower part of the frontal area, and a longitudinal streak bisecting the clypeus, yellow. In this it resembles *damascenus* ♀; but the ground colour of the clypeus is black, not red; and it differs also from normal examples of *damascenus* in having a black postscutellum, and entirely yellow tibiæ.

* *Hylaeus*, F=*Prosopis*, Jur.

The ♂, I believe, is undescribed. It differs from the ♀ only in the usual sexual characters, being considerably smaller (barely 5 mm. long) and more slender; the face more elongate and entirely pale yellow; the scapes of the antennæ curved, slightly incrassate and dilated towards their apices, and yellow in front; the flagella more widely piceous than those of the ♀.

H. scutellaris was described in 1873 from "Bacu." I cannot find that it has ever been recorded since.

4. *Hylæus moricei*, Friese.—1 ♀, Qazvin (P), 17th July.

I took this species pretty commonly at Suez in 1896; Herr Alfken tells me that he has specimens from Araxes-thal and also from Hungary, so it is apparently widely distributed.

5. *Sphecodes gibbus*, L.— 1 ♀, Amara (M), 8th June.

The specimen is broken, but I have no doubt it is a *gibbus*. As often in examples from S. Mediterranean districts, the tibiæ and tarsi are testaceous.

6. *Halictus scabiosæ*, Rossi.—1 ♂, 1 ♀, Amara (M), 12th September.
5 ♀♀, Qazvin (P), 8th August.

7. *Halictus quadricinctus*, F.—5 ♂♂, 4 ♀♀, Talish (P), 10th July.

8. *Halictus tetrazonius*, Kl.—1 ♀, Qazvin, 17th July.

9. *Halictus leucognathus*, n. sp. ?—1 ♂, Baquba (M), 17th July.

Herr Alfken, to whom I sent this specimen, suggested, but with doubt, that it might be the *senilis* of Eversmann; but after careful consideration of the description of *senilis* I do not think this likely. That species is said to be smaller than *H. rubicundus*, whereas this is a large form—fully as large as *scabiosæ*, *sexcinctus*, etc. Nor does Eversmann describe *senilis* as having the mandibles largely white, which is a conspicuous and very distinctive character of *leucognathus*, and has suggested the name which I propose for it.

In the Saunders' Coll. at South Kensington there is an unnamed specimen of the same ♂, taken in Greece by the late Sir S. S. Saunders, and bearing a label signed 'J. Vachal' remarking on the above peculiarity. Herr Alfken tells me that he has a ♂ like the present specimen, and that this too was taken in Greece.

Although superficially much resembling *scabiosæ*, etc., it seems to be really much more nearly allied to the smaller species *H. tetrazonius*, Kl. It agrees with the latter exactly, and differs from *scabiosæ*, in the structure of the antennæ, and the genitalia—also, to some extent, (as Herr Alfken observed) in the form of the head, though the mandibles are not dilated and the tempora (behind the eyes) are little if at all excavated beneath. (See Fig. 2.) The antennæ (except their two black basal joints) are entirely testaceous, the apical joint is not curved, and all joints from the fourth onwards are tuberculate beneath as in *tetrazonius*. The other pale parts of the body—namely the apex of the clypeus, the labrum, a large triangular mark on each mandible and the greater part of the legs, which, as usual, are partly black (especially the anterior femora behind, and those of the hind legs in front also)—are not *yellow* (as according to Eversmann in *senilis*), but definitely *white*. The stigmata of the wings, however, and their veins (except the middle part of the subcosta which is fuscous) are yellow.

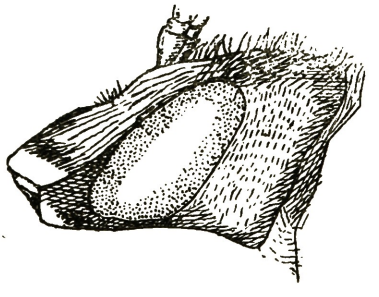


Fig. 2.

All the pilosity is snow-white or silvery, as in many "desert-forms". Tergites 1 to 5 of the abdomen have each a broad entire apical fascia, as in *scabiosæ*, etc., and tergites 2 and 3 are also fasciated (but more thinly) at their bases. The

tempora in certain lights are seen to be covered with a very short silvery pubescence, the hairs on the face are much longer, and decumbent; on the vertex and round the antennæ they are erect.

I have extracted the genitalia, and they appear to me exactly like those of *tetrazonius*. But I do not think that this and the other points of agreement between forms differing so much in other characters (stature, colour, pilosity, etc., etc.) would justify me in treating them as actually conspecific.

10. *Halictus platycestus*, Dours.—3 ♂♂, 5 ♀♀, Talish (P), 10th July.
3 ♀♀, Amara (M), "on Sunflowers," 9th—12th September.

I think these are conspecific with a ♀ which I received, named as above, from the late Professor Perez.

11. *Halictus leucozonius*, Kirby.—1 ♀, Amara (M), April.
1 ♀, Baquba (M), 30th June.
2 ♀♀, Baghdad (M), 26th July.
1 ♀, Talish (P), 10th July.

12. *Halictus chaldæorum*, n. sp.—3 ♂♂, Amara (M), 6th September—31st Oct.
2 ♀♀, Shahroban (M), 31st August.

I can find no description to suit this species. It is a very diminutive membe of the *leucozonius* group (5 to 6 mm. long). In its short broad form, in coloration, and in the sculpture of the propodeum, it comes near *interruptus*, Panzer. It seems also allied to *quadrinotatus*, Kirby, and *lativentris*, Schenck (=*decipiens*, Perkins). But it differs from all these in having the postscutellum densely tomentose in both sexes, in the uninterrupted and very conspicuous (almost, squamose) basal fasciæ on the intermediate abdominal segments, in the characters of the ♂ genitalia, and the structure of the inner hind calcar of the ♀ as well as in other minor details.

In the ♂ the antennæ (beneath from the 3rd joint onwards), and the tegulæ are fulvous—almost yellow. The clypeus is narrowly yellow at the apex, but the labrum is black. The tarsi of all the legs are yellow, and the tibiæ (especially the anterior pairs) are more or less yellow within. The propodeum has a sharply defined, undulately rugose, basal area which is narrowly truncate (not rounded) at its apex. The mesonotum is opaque, very finely and closely punctured. The postscutellum densely clothed with short erect pilæ, completely hiding its actual surface. The thorax and legs are hirsute (much more so than in *interruptus*). The abdominal tergites are very shining; finely but not closely punctured on their discs, but with the depressed apical margins practically impunctate. Tergite 1 is pilose at the base; 2, 3, and 4 have entire and very conspicuous basal fasciæ of white and partly scale-like hairs. The 4th ventral segment is strongly excised at its apex and conspicuously fringed with long, white, decumbent hairs. The wings are clear, and the stigma yellowish.

The ♀ is very like the ♂, but the mesonotum is less closely punctured and slightly shining, and the disc of the 1st abdominal tergite quite impunctate. The antennæ beneath and the tarsi are darker than in the ♂, but at least more or less fulvescent. The inner hind calcar is unlike that of any *Halictus* ♀ known to me, being armed with *a single pair only* of long blunt spines (See Figure 3). I notice also that the posterior ocelli are considerably nearer to the compound eyes than to each other. This is not the case in any of the other females with which I have compared these specimens.

Fig. 3. *Hind Calcar of H. Chaldæorum* ♀.

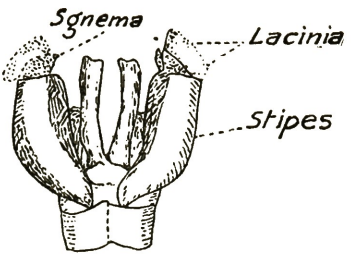


Fig. 4. *Genital Armature of H. Chaldœorum.*

The genital armature of the ♂ has a singular character, but it is difficult either to describe or figure it intelligibly. The *squama* at the apex of each *stipes* (which in 4 *notatus* is comparatively simple, and in *lativentris* is so pilose that it can hardly be seen at all) is in this species crossed and partly concealed (in the dorsal view) by a long semitransparent *'lacinia'* clothed with microscopically fine pubescence, into which it (the squama) is produced. In the accompanying rough sketch (Fig. 4) drawn from a preparation mounted in balsam this lacinia is inevitably so much foreshortened as to give a very unsatisfactory idea of its actual outline, but when viewed in such an aspect as to shew its full length it appears on the whole very elongately triangular, tapering gradually towards a bluntly pointed apex, and projecting to a considerable distance beyond the external outline of the stipes.

The species occurred visiting flowers of *Zizyphus.*

13. *Halictus longulus*, F. Smith.—1 ♂, Shahroban (M), 31st July.
1 ♂, Qazvin (P), 17th July.

14. *Halictus cingulatus*, Morawitz.—2 ♂♂, Qazvin (P), 17th July and 8th August.
5 ♀♀, Qazvin (P), 8th August.
1 ♀ Enzeli (P), 24th September.

15. *Halictus amaranus*, n. sp.—1 ♀, Amara (M), 7th July.

I feel some doubt whether this is more than a local race of *picipes*, Morawitz; but as Herr Alfken considers it to be certainly a new species "near *obscuratus* Mor." It may be as well to treat it as such provisionally.

The single specimen before me is in most beautiful condition. I find in it all the chief characters ascribed by Morawitz to *picipes* ♀—also apparently a "unicum"—including those by which he separates that species from *obscuratus* described immediately afterwards.

The coloration only seems to be rather brighter; approximately the apical half of each abdominal tergite is distinctly red, only its extreme apical margin is pale and scarious (yellowish); and all the tibiæ and tarsi are flavescent; whereas in *picipes* only "the posterior tarsi" and "the hind tibiæ" are described as "piceous," and of the abdominal tergites Morawitz says simply "*apice pallide-rubro.*"

All the abdominal segments including the 1st are absolutely opaque (except their linear scarious yellow margins) and covered with an intensely fine and close puncturation. The propodeum is truncate, with a transverse, well defined, basal area, closely and irregularly but minutely rugulose, and sharply margined at the sides; the mesonotum, and especially the scutellum, more largely but less closely punctured than the abdomen, and so not quite dull; the postscutellum covered with dense short tomentum; the first four abdominal tergites have each a distinct and entire basal fascia of white hairs (some of which are scale-like), and those on tergites 3 and 4 are extremely broad (covering nearly half the segment). The sternites, like the tergites, have rufescent apices, and are clothed with many long sub-erect hairs of even length, forming almost such a "ventral brush" as characterizes the group "*Gastrilegidæ.*" The whole of the above described pilosity is white, or rather colourless. The clypeus is moderately convex and produced, distinctly shining, with comparatively few, but large,

punctures. The mandibles are rufescent at their apices, the antennæ beneath largely fulvous, the tegulæ, costæ, and stigmata of the wings, and the tibiæ and tarsi of all the legs, yellowish.

16. *Halictus kervilleanus*, Pérez?—1 ♀, Amara (M), 11th May.

I name this very doubtfully, though it agrees in most respects with Pérez's brief diagnosis, *e.g.*, the mesonotum is extremely shining, *apparently* quite impunctate—the pin unluckily makes it impossible to be certain of this !—and the propodeum is also as described for *kervilleanus*. But the tibiæ and tarsi are largely flavescent, and if *kervilleanus* has that character the author has not mentioned it. (Seems also near to *pauxillus* !)

17. *Halictus villosulus*, Kirby—1 ♀, Qazvin (P), 8th August.

Determined for me by Herr Alfken. The mesonotum much more closely punctured than in British specimens.

18. *Halictus lucidulus*, Schenck.—1 ♂, 1 ♀. Qazvin (P), 17th July.

The ♀ was determined by Herr Alfken. I have no doubt that the ♂ belongs to it.

(The next 7 species all belong to the group with æneous reflections on at least the head and thorax. Spp. 22-25 were determined for me by Herr Alfken.)

19. *Halictus variipes*, Morawitz.—1 ♀, Amara (M), 17th September.
14 ♀♀, Amara (M), "on *Zizyphus*", 9th September.
3 ♀♀, Amara (M), 25th, 26th June and 18th July.
2 ♀♀, Qazvin (P), 17th July.

20. *Halictus vestitus*, Lep.—1 ♂, Khaniqin (M), 1st August.
1 ♂, Shahroban (M), 31st July.

To this species Herr Alfken refers *pulvereus*, Morawitz. The description of the latter well suits the specimen from Khaniqin. That from Shahroban is much rubbed, but I have little doubt the two are conspecific. Both have what Morawitz calls "appendix distinctus" at the middle of the margin of the 4th abdominal sternite.

21. *Halictus*, sp.?—1 ♀, Qazvin (P), 17th September.

A small insect, much rubbed, but it seems, when fresh to have been entirely covered with dense silvery pilosity. The head and thorax, dark metallic green, the abdominal segments carneous with yellowish margins. I cannot identify it with any described species.

22. *Halictus, dissidens*, Pérez.—1 ♀, Talish (P), 10th July.

23. *Halictus mucoreus*, Eversmann.—1 ♂, 1 ♀, Qazvin (P). 17th July.

24. *Halictus mongolicus*, Morawitz.—1 ♀, Amara (M), "on Acacia," 13th June.

25. *Halictus sogdianus*, Morawitz.—1 ♀, Baquba (M), 27th July.

26. *Nomioides variegata*, Oliver.—5 ♂♂, Amara (M), 9th-17th September.
1 ♂, Amara, November.
1 ♀, ,, 9th September.

This and also the following sp. occurred "on *Zizyphus*."

27. *Nomioides excellens*, E. Saunders.—6 ♂♂, Amara (M), 31st August—17th September.
1 ♀, Amara (M), 17th September.

I have named these after comparing them with Saunders's Types. They are much larger insects than any other *Nomioides* known to me.

(To be continued).

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, JULY 31, 1921.]

FRESH-WATER CRUSTACEA COLLECTED BY DR. P. A. BUXTON IN MESOPOTAMIA AND PERSIA.

BY

ROBERT GURNEY, M.A.

(*With two plates and two text figures.*)

The Crustacea recorded in the following report were collected by Dr. Buxton during 1917 and 1918, mainly in the neighbourhood of Amara in Mesopotamia but a few collections were also made in North Persia and are included in the list.

My expectation had been that the district of Amara would have been a very favourable one for Phyllopoda, and also that the Entomostraca would show a distinct mingling of eastern and western forms, but these expectations have not been realised. Only two species of Phyllopod are included in Dr. Buxton's collections, and the remaining Entomostraca recorded are, with the exception of *Daphnia lumholtzi* and *Moina dubia*, of a European type.

Between Basra and Amara there are immense areas of permanent shallow marsh on either side of the Tigris, generally some way from the river. The fauna of these marshes was sampled by Dr. Buxton at Azize, Kharaba (E. of Amara) and at Ezra's Tomb on the Tigris between Amara and Basra. Though 15 species were taken at the latter place the fauna seems to be surprisingly scanty. Dr. Buxton suggests that the scantiness of the fauna may be due to the intense sunlight and high temperature of the shallow water during the day-time in summer, or to the great daily fluctuation in temperature. With the exception of this marsh most of the collections were made in temporary pools where a varied fauna was not to be expected. In North Persia, on the other hand, the conditions seem to be much more favourable, and the collections from Resht and Enzeli contain a larger number of species than any of those from Mesopotamia, though their state of preservation makes the identification of some of them impossible.

I have not thought it necessary to give lists of the species included in the various collections since, for the most part, they were made in temporary pools and contained very few species. Two, however, seem to me of sufficient interest to record in full, namely, those taken in the permanent marsh at Ezra's Tomb near Amara and at Resht in North Persia.

Ezra's Tomb. 23.2.18.

A large swamp close to the Tigris with water from 2 to 4 feet deep. A broad belt of reeds, with submerged water plants and extensive open water.

Daphnia lumholtzi, Sars. Several young; few adults.
Daphnia longispina, O. F. M. Common, males present.
Simocephalus exspinosus, Koch. Common.
Scapholeberis mucronata (O. F. M.). Rare.
Bosmina longirostris, O. F. M. A few.
Ceriodaphnia reticulata (Jurine). Rare.
Alona rectangula, Sars.
Alona costata, Sars.
Chydorus sphæricus (O. F. M.). Common.
Diaptomus vulgaris, Schmeil. Common.
Cyclops vicinus, Uljanin. Rare.
Cyclops agilis, Fischer-Sars. Rare.
Canthocamptus staphylinus, Jurine.

Cypris pubera, Muller.

Rotifera—Asplanchna sp.
Dinocharis pocillum (Muller).
Ascomorpha sp.

Resht, N. W. Persia. Ponds and ditches. March 1919.
At sea level, in thick forest of a very wet type.

Daphnia longispina, O. F. M. Rare.
Daphnia pulex obtusa, Kurz. Rare.
Simocephalus vetulus (O.F.M.). Common.
Scapholeberis aurita (Fischer). Common.
Ceriodaphnia reticulata (Jurine). Rare.
Alonella excisa (Fischer). A few.
Chydorus sphæricus (O. F. M.). Abundant. Males and ephippial females present.
Cyclops viridis, Jurine. Common.
Cyclops vernalis, Fischer. Rare.
Diaptomus—three species unidentified.
Canthocamptus staphylinus, Jurine. Rare.
Cypris virens, Jurine.
Asellus aquaticus, Linn.-Sars.

List of Species.

I. MALACOSTRACA*

Sesarma boulengeri, Calman. (Ann. Mag. Nat. Hist. (9) V. 1920).
Fao, Persian Gulf, in brackish water.
The specimens from which Dr. Calman's description was taken were collected at Basra, in fresh water.

Potamon fluviatile var. *ibericum*, Marschall de Bieberstein.
Tula Rud (S. W. Caspian), Qazvin and Kermanshah (N. W. Persia).

Potamon fluviatile var ? Qalat Saleh, R. Tigris.

II. ENTOMOSTRACA.

1. Phyllopoda.

Artemia salina var. *arietina*, Fischer—Daday.

A large number of specimens of *Artemia* were taken in saline pools in the neighbourhood of Amara, but among them no males were found. The number of setae on the furcal rami is very variable, ranging between 12 and 2, the average being 8 on each ramus.

Apus asiaticus nom. nov.

Apus granarius, Sars. Ann. Mus. St. Petersb. VI. 1901, p. 4.

I have received from Dr. Annandale and from Dr. W. T. Calman specimens of Apus taken at Bagdad, and, though Dr. Annandale's specimens are small and immature, I have no doubt that all belong to the same species. The adults agree very closely with the species from Central Asia described by Prof. Sars under the name of *A. granarius*, Lucas, but I am not satisfied that that name is correctly applied. M. Simon's description (Ann. Soc. Entom. France VI. 1886, p. 446) is not very full and no figures are given, but he states that the flagellum of the first leg exceeds the length of the dorsal shield, which is far from being the case in Prof. Sars' species and my own. There are other differences also with regard to the length of the furcal rami, which M. Simon also states are " prope basin obtuse dentati haud setosi ", and the denticles on the sulcus of the dorsal

* I am indebted to Dr. W. T. Calman for the identification of these Crabs.

shield which in *A. granarius* are few and very minute. In view of these differences I regard *A. granarius*, Sars, as distinct from *A. granarius*, Lucas, and for that reason I have reluctantly introduced a new name.

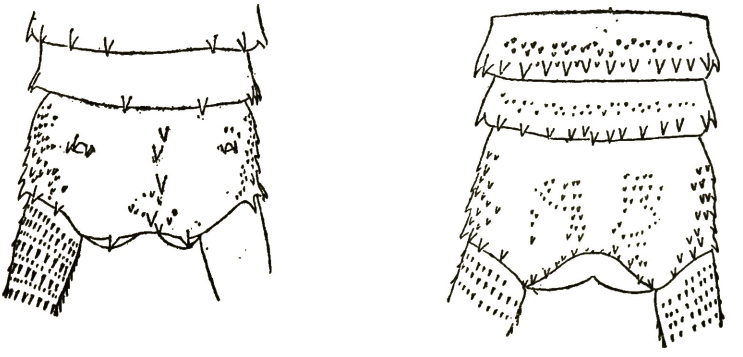


Fig. 1. Last Abdominal Segment of *Apus asiaticus* ♀. A=Dorsal view. B=Ventral view.

Next Segments:—No. 3—11 spines, No. 4—9, No. 5—10, No. 6—9, No. 7—9, No. 8—11, No. 9—9, No. 10—9, No. 11—11, No. 12—11, No. 13—11.]

I was at first inclined to refer these specimens to *A. dukianus*, Day, but have had the opportunity of examining the type of that species, which proves to be entirely distinct. The following measurements, together with figures of the last abdominal segment, are given for purposes of comparison with the description and figures of Prof. Sars :—

—	Length of dorsal shield (median).	Length of dorsal shield to post angle.	Width of dorsal shield.	Total length of animal (without furca).	Length of furcal rami.	Number of segments uncovered.	Number of limbless segments.	Number of denticles on sulcus of shield.	Length of 4th flagellum of first leg.
Male ..	15	18	13	35	20	28	12	44	10
Female ..	13	16	12	27	15	25	9	44	9
	(Measurements in Millimetres.)								

The species is closely related to *Apus numidicus*, Grube which appears to range from South Africa to Central Asia, but I believe that two or more distinct

species have been confused under the name of *A. numidicus* and hope to be able to give reasons for this opinion on a future occasion.

Leptestheria sp.?

A number of specimens of *Leptestheria* were found in collections made at Amara, and these I believe represent a species hitherto undescribed. In shape of shell they closely resemble *L. ticinensis*, Crivelli, but the arrangement of spines on the post-abdomen is quite distinct and unlike that of any species known to me. Unfortunately Dr. Daday has published in the Hungarian language short diagnoses of a number of new species of *Leptestheria* (Math. Term. Ert. 1913), and, as these diagnoses are unaccompanied by figures, they are unintelligible to me. Until Dr. Daday completes his monograph of the *Conchostraca* in a language generally understood, the existence of this Hungarian synopsis effectually limits the study of the group to those who can read this difficult language.

Baird (Proc. Zool. Soc. 1862, p. 148) has recorded the occurrence of *L. dahala censis*, Rupp., together with *Estheria lofti*, Baird, from pools by the river Tigris near Bagdad.

2. Cladocera.

Daphnia lumholtzi, Sars. Taken in November and December1917 in fire buckets at Amara, and also in permanent marsh at Ezra's Tomb in February 1918. In the former locality the adults had extremely short head spines, and the posterior spine followed nearly the median line of the body, whereas in the young the head spine was long and the posterior spine dorsally directed. Specimens from Ezra's tomb were of typical form. The species is recorded from Australia, East Africa, Egypt and Palestine.

Daphnia magna, Strauss. In flood waters at Amara in January and March 1918. Though males were present no ephippial females were taken. Found also at Qazvin in N. W. Persia.

Daphnia pulex, De Geer. The obtusa form of this species was taken at Resht in N. W. Persia in March 1919.

Daphnia longispina. O. F. M.

Ezra's Tomb, Mesopotamia, and at Resht N. W. Persia.

Simocephalus exspinosus, Koch.

Abundant at Amara in the moat of Fort Farm.

Simocephalus vetulus. O. F. M.

Amara—in a disused well. Azize, Mesopotamia; Enzeli and Resht, N. W. Persia.

Scapholeberis mucronata (O. F. M.)

The hornless form of this species was taken in small numbers at Ezra's Tomb (February 23rd, 1918).

Scapholeberis aurita (Fischer).

Common at Resht, N. W. Persia.

Ceriodaphnia reticulata, Jur.

Amara and Ezra's Tomb; Resht and Enzeli.

Moina rectirostris, Jur.

In flood pools at Amara. Common.

Moina dubia, Richard.

A few specimens of this species were found in a collection from the moat of Fort Farm, Amara.

In some respects these specimens are intermediate between *M. dubia* and *M. micrura*, Kurz, since for example the postanal part of the postabdomen is considerably shorter than that of typical *M. dubia*. On the other hand the comparative length of the antenna, the total length of the postabdomen as compared with the body, the presence of transverse rows of cilia on the postabdomen and

of a delicate comb on the claws sufficiently identify these specimens with *M. dubia*. The following table will make the comparison clear:—

	Proportion of 1st antenna and total length of body.	Proportion of 1st. postabdomen to total length of body.	Proportion of post-anal part to whole postabdomen.	Proportion of length of claws and postabdomen.	Number of teeth on postabdomen.
M. dubia—Amara	1 : 5	1 : 2·3	1·3·5	1 : 5·2	6–8
M. dubia—R. Nile	1 : 5·9	1 : 2·4	1·2·3	1 : 5·3	6–7
M. micrura	1 : 6·5	1 : 2·7	1·4	1 : 6	6–8

Moina dubia is a characteristic feature of the plankton of the Nile throughout its length, and is found in Victoria Nyanza, where it forms the bulk of the plankton (Daday) and in various places in the neighbourhood of Lake Nyassa. It was originally described from West Africa (Senegal) and is evidently a widely distributed African species. On the other hand I have seen specimens hatched from dried mud from Palestine, and its occurrence there is comparable to that of the Nilotic species of fish and other vertebrates. Its extension to the Tigris region is noteworthy, though the Cladocera are not a suitable group from which to draw evidence for zoogeographical problems.

Bosmina longirostris, O. F. M.

Ezra's Tomb, Mesopotamia.

Alona costata, Sars.

Ezra's Tomb. One individual only.

Alona guttata, Sars.

Enzeli, North Persia. Rare.

Alona rectangula, Sars.

Ezra's Tomb, Mesopotamia and Enzeli, North Persia.

Alonella excisa (Fischer).

Resht and Enzeli, North Persia.

Pleuroxus aduncus (Jurine).

A single specimen taken at Amara (Bet Khodayer).

Alonella excisa (Fischer).

Resht and Enzeli, North Persia.

Chydorus sphæricus, O. F. M.

A very strongly reticulate form occurred at Ezra s Tomb. Abundant in a collection from Resht, males and ephippial females being present.

3. Copepoda.

Cyclops vicinus, Uljanin.

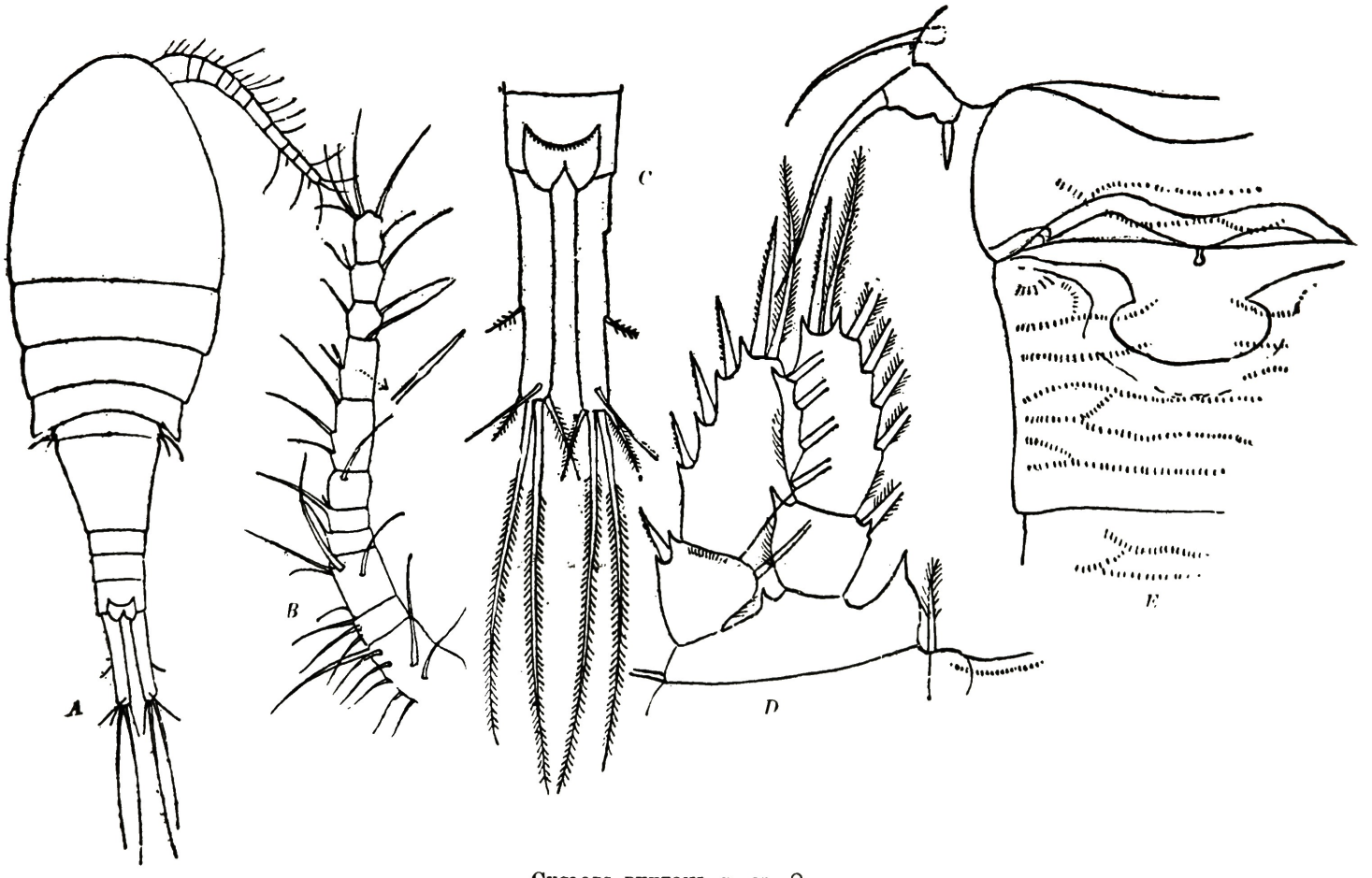
Ezra's Tomb, rare. The occurrence of this species in this locality is somewhat surprising, having regard to the extreme heat of the waters of the Amara district in summer, since it is a distinctly northern species, like its close ally *C. strenuus*. It has been recorded from Sweden, Central Asia, Turkestan, Kolguev, Volga Delta, Aral Sea and China. My specimens agree in every respect with the description given by Prof. Sars (Crustacea of Norway).

Cyclops viridis, Jurine.
Irrigation runnel at Amara. Resht and Enzeli, N. W. Persia.
Cyclops vernalis, Fischer.
Resht, N. W. Persia.
Cyclops bicuspidatus, Claus.
Amara. The variety with 14 joints in the Antenna (*C. lubbocki*, Brady) was taken in a disused well together with *Cyprinotus incongruens*, but the typical form was found in flood water near the Sheikh's house (Bet Khodayer) at Amara.
Cyclops leuckarti, Claus.
Amara. In small numbers in several collections.
Cyclops crassus, Fischer-Sars.
Amara. In the moat of Fort Farm.
Cyclops albidus, Jurine.
A single male was taken at Kharabah Marsh and two females at Azize, both these localities are in the great permanent marsh east of Amara.
Cyclops agilis, Fischer-Sars.
Ezra's Tomb, Mesopotamia, and Enzeli, N. W. Persia.
Cyclops affinis, Sars.
A single mature female taken at Azize, Amara.
Cyclops bicolor, Sars.
Enzeli, N. W. Persia.
Cyclops diaphanus, Fischer.
Amara, in flooded ditches, and at Gantra Sarut on the E. bank of the Tigris between Aligharbi and Amara. Prof. Sars (Crustacea of Norway) has identified *C. diaphanus*, Fischer, with *C. nanus*, Sars, but it seems to me that Fischer's description is so scanty and ambiguous that it is advisable to follow the interpretation placed upon it by Claus, Schmeil and others and to apply this name to the species of *Cyclops* fully described by Claus first as *Cyclops minutus* and later as *C. diaphanus*, Fischer. *Cyclops nanus*, Sars, is a very distinct form closely related to *C. languidus*, Sars, and a transfer of the name *diaphanus* to it will, in my opinion, only lead to confusion.
Cyclops buxtoni, n. sp.
Body robust, the cephalothorax slightly longer than the abdomen; epimera of the thoracic segments 1-3 not prominent. Segment 4 somewhat produced laterally. Genital segment of abdomen broad and slightly exceeding the length of the 3 following segments. Anal operculum fringed with minute denticles. Ventral surface of genital segment marked with lines of very minute cilia. Furcal rami long and slender, equal in length to the 3 preceding segments, and not divergent. Lateral seta inserted a little behind the middle of their length. The outermost apical seta slightly shorter than the innermost; the two inner setae of nearly equal length, the inner one less than twice the length of the furca. The first antennæ consist of 11 joints and are considerably shorter than the first segment of the thorax. The eighth joint bears a sensory rod. Comparative length of joints as shown in following formula:—

20.	6.	13.	5.	4.	9.	15.	14.	8.	9.	11.
1	2	3	4	5	6	7	8	9	10	11

Swimming legs with all rami two-jointed. The second joint of the exopodite of the first leg bears 3 spines, while that of each of the three following pairs bears four. The endopodite of the fourth leg bears at its apex a single long spine and a seta. The first joint of the fifth leg is not distinct, its seta being apparently borne on the outer dorsal edge of the segment. The second joint is of peculiar shape, short and broad, bearing a long seta on its outer angle and a short spine on the inner side. This inner spine is longer in the male than in the female. Length 1·1 mm.

MESOPOTAMIAN CRUSTACEA.



CYCLOPS BUXTONI, n. sp. ♀.

A.—Dorsal view. B.—First antenna. C.—Furcal rami. Right ramus slightly abnormal. D.—Leg of fourth pair. E. -Genital segment and fifth leg.

bear on the *dorsal* surface of the second and third segments of the abdomen a cluster of enormous spermatophores, the adhesive material of which almost covers and obscures the segments themselves.

Diaptomus, sp.

A collection from Resht contains three species of *Diaptomus*, but unfortunately every specimen is badly damaged and I am unable to name any of them. Of one species there are two male specimens of enormous size which resemble *Hemidiaptomus ignatovi*, Sars, but both of them lack the prehensile antenna and the fifth pair of legs.

4. Ostracoda.

Notodromas persica, n. sp.

A few specimens of a small species of *Notodromas* were found in a collection from Resht (N. W. Persia) but the shells are so soft and distorted that a satisfactory description of their shape cannot be given. Neither valve shows any sign of spines. The outline figure given is taken from a mature female which was comparatively undistorted, but, having regard to the softness of the shell, too much reliance must not be placed upon it. The two sexes seem to be alike in shape.

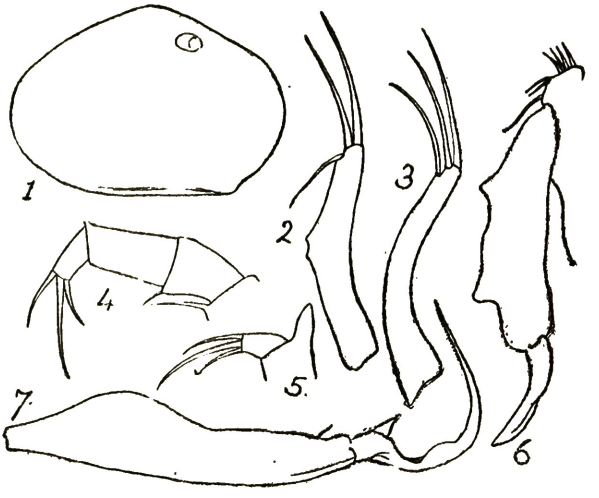


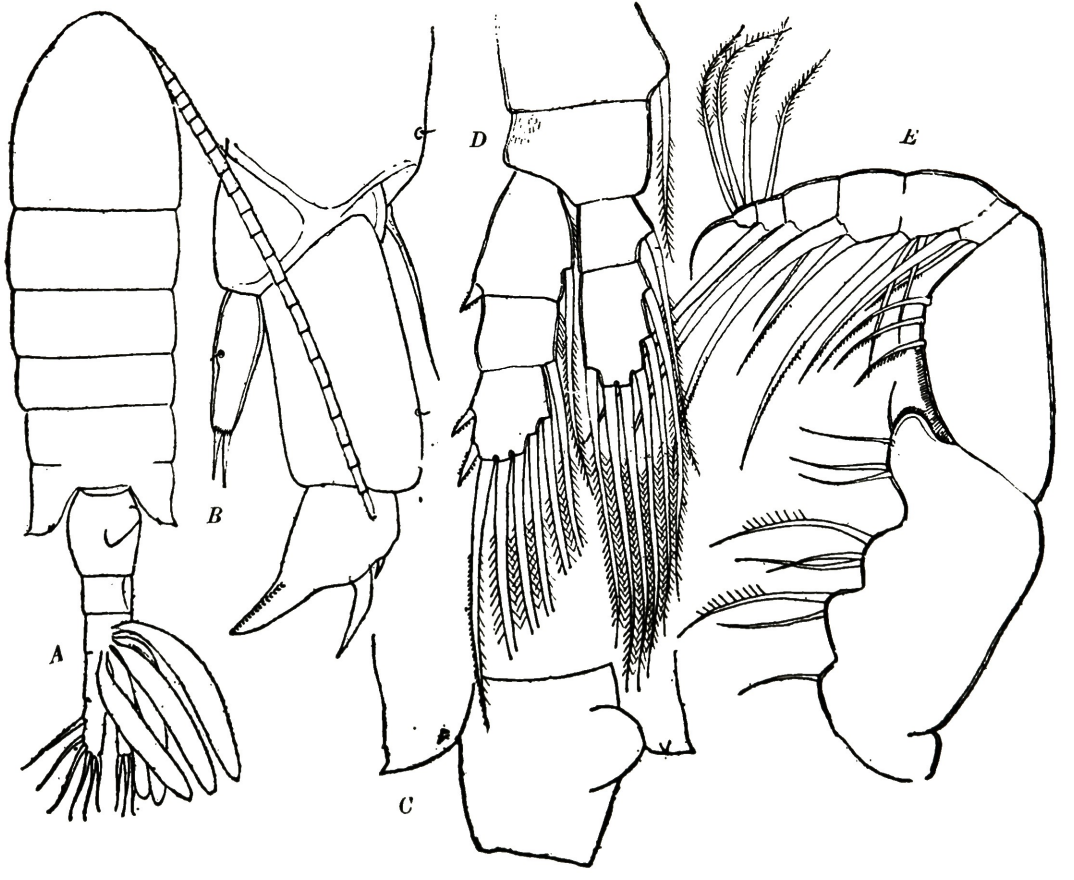
Fig. 2. *Notodromas persica*, n. sp.

1. Right shell of female. 2. Furcal ramus of young male. 3. Furcal ramus of adult male. 4. First leg of adult male. 6. First leg of young male. 6. Prehensile appendage of left side of male. 7. Prehensile appendage of right side of male.

The second antennæ consist of five joints only, the third and fourth being fused. The arrangement of setæ is as in *N. monacha*. The large seta borne on the anterior lower corner of the second joint is as long as the next two joints combined, extending to the apex of the limb.

The first maxilla of the male bears very large prehensile orangs. That of the right side consists of an elongated stem, somewhat swollen at its base, and a large sickle-shaped hook, denticulate at its extremity and bearing a broad

MESOPOTAMIAN CRUSTACEA.



DIAPTOMUS CHEVERUXI ♀.

A.—Dorsal view. B.—Fifth foot. C.—Dorsal view of last Thoracic and first abdominal segments. D.— First leg. E.—Maxilipede.

triangular spine at its base. The appendage of the left side is shorter and stouter, with two conspicuous knobs along its lower margin and with a slightly curved, somewhat lamellar, hook.

The first leg, in immature specimens, has a large protuberance at the angle of the penultimate joint, and a trace of this protuberance remains in the adult. The furcal rami of one male examined are similar to those of *N. monacha*, having a much curved shaft and three subequal setæ at the end, but in all other specimens, male or female, they are shorter and stouter, and remarkable for the presence on the dorsal margin of a double tubercle about the middle of its length. Probably, this, as also the form of the first leg, is a mark of immaturity.

Length of shell ·75 mm.
Height ,, ·38 mm.

The description given above is, owing to the nature of the material, very incomplete; but the species appears to me to be clearly distinct. It resembles *N. entzi*, Daday, in some respects, but differs strikingly in the form of the prehensile appendages of the male and the form of the furcal rami.

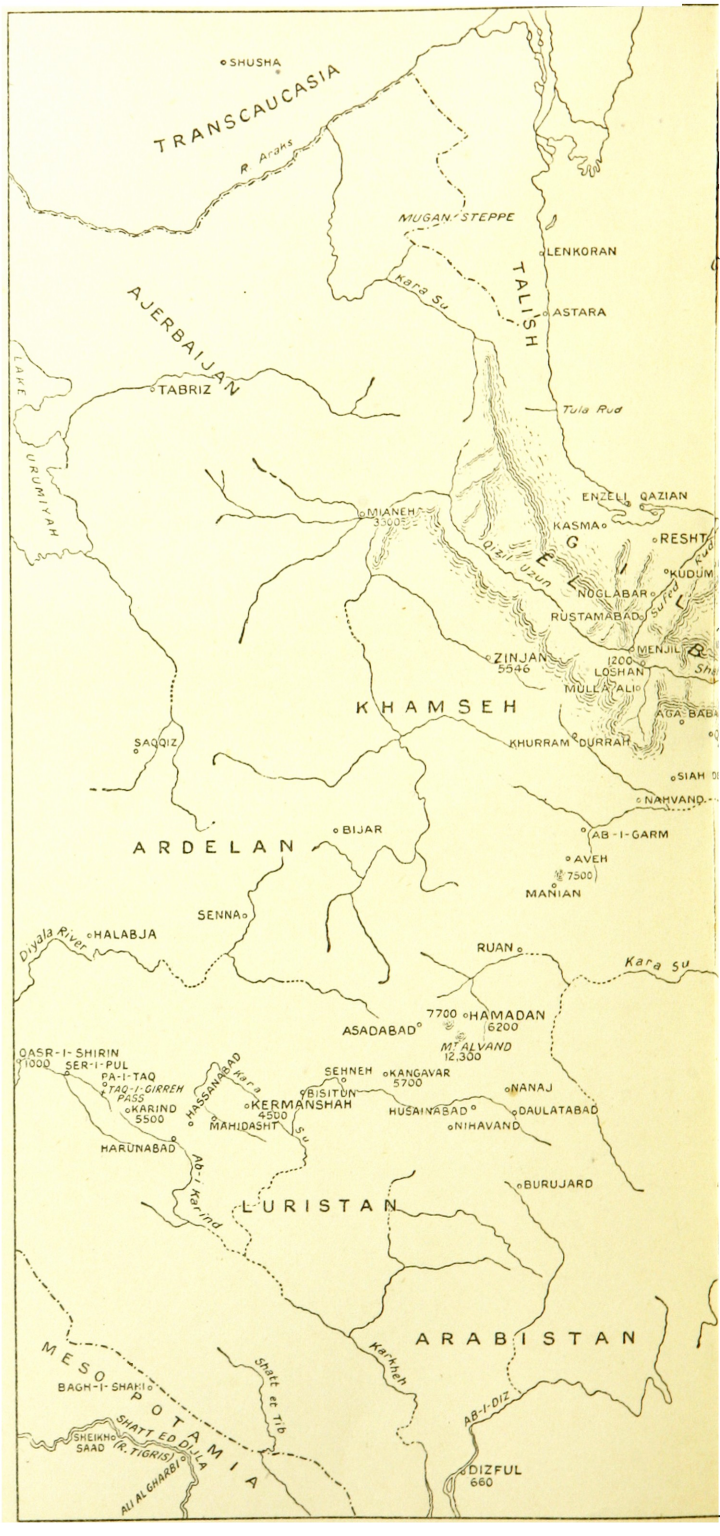
Cyprinotus dentatomarginatus, Baird-Sars.
Amara—Fort Farm moat.
Cyprinotus incongruens, Ramd.
Kharabah Marsh near Amara.

The specimens examined differ from the type in having rather more conspicuous tubercles on the shell margin, but agree so closely in other respects that I consider they should be referred to this species.

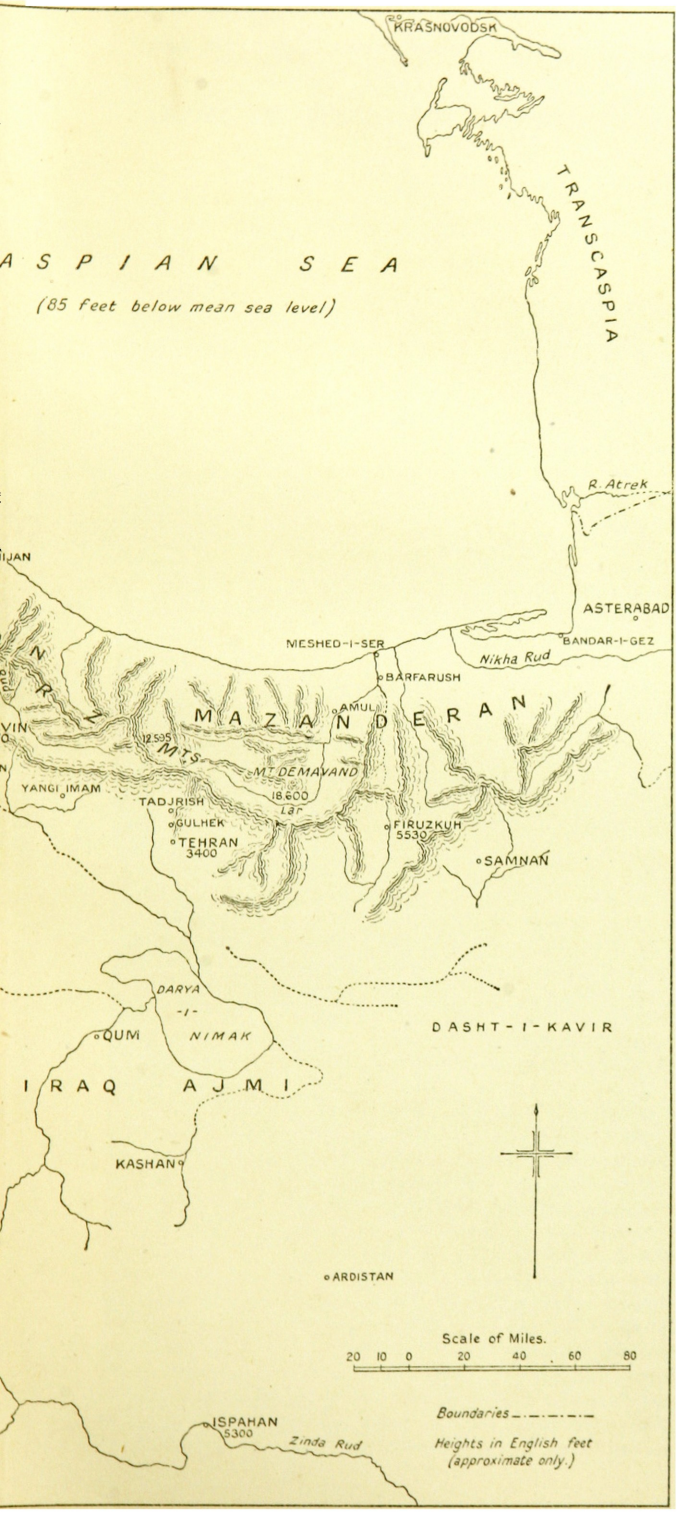
Eucypris virens, Jurine-G. W. Muller.
Resht, N. W. Persia.

The identification of this species is rather doubtful, since the specimens were so damaged that only a single shell valve was found intact.

Cypris pubera, G. W. Muller.
Amara and Ezra's Tomb, Mesopotamia. Enzeli, N. W. Persia.
Herpetocypris reptans (Baird).
Enzeli, N. W. Persia.
Potamocypris variegata (Brady & Norman).
Enzeli, N. W. Persia.
Ilyocypris bradyi, G. O. Sars.
Amara.



Map illustrating Mr. P. A. Buxton's Paper



Birds of Northern and Western Persia.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, JULY 31, 1921.]

NOTES ON BIRDS FROM NORTHERN AND WESTERN PERSIA

BY

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(*With a Map.*)

The following notes are based on several small collections made by Officers on active service in N. W. Persia in 1918 and 1919. The Society has lent me skins from the Cox-Cheesman collection, collected by Major R. E. Cheesman, I.A.R.O., while travelling from Baghdad to Tehran, and from Tehran to Enzeli in May and June 1919, and a few very interesting skins collected by Capt. C. M. Ingoldby, R.A.M.C., at Zinjan in Khamse and at Bandar-i-Gaz in Asterabad Bay. I am extremely obliged to the Society for the loan of these specimens, and to Major Cheesman for a copy of his very full notes. The majority of the specimens which I examined were collected by myself in 1918 and 1919. Cheesman's and Ingoldby's specimens and notes have been distinguished by the initials "R. E. C." and "C. M. I."; records and skins not so distinguished may be presumed to be my own. Any record to which no date is given refers to the year 1919.

It is a pleasure also to acknowledge my deep debt to Lord Rothschild and Dr. Hartert at Tring, to the authorities in the Bird Room of the British Museum, and to Mr. H. F. Witherby and Dr. C. B. Ticehurst. I feel that I may congratulate myself that it has not been found necessary to describe a single new sub-species. The value of the sub-species as a record of geographical or environmental variation, and as a means of calling attention to what appear to be species in the making, is a thing which few modern zoologists would dispute. The description of sub-species from Persia, however, has done more than keep pace with our knowledge of the avifauna, and it is to be regretted that the greatest investigator of the birds of Persia, the late N. Zarudny, too often described new races, without sufficient reference to the work of ornithologists in Western Europe.

In this paper I always refer to a species by its binomial name, unless actual specimens were obtained for comparison. This is perhaps an unnecessary refinement for in most cases one could confidently give a sub-specific name on geographical grounds. Though there is little that is unexpected in the present paper I feel that it has value, partly because we resided some time in the country, partly because as a result of our collecting a number of previously described sub-species have now been critically examined and compared with the great collections at Tring and the British Museum. As will be seen below I have felt justified in sinking a number of sub-species described by Zarudny and others.

We find that we have added but two sub-species to the Persian avifauna, *Galerida cristata subtaurica* and *Passer domesticus biblicus*, and the first of these only appears on the Persian list in substitution for *G. c. caucasica*. The most striking thing about the fauna which we saw was the extremely sharp line of division between the forests of Gilan and the semidesert plateau. This is dealt with in some detail below, but is already well known, principally from Witherby's papers (1910). A point to which perhaps less attention has been directed, but which is now quite clear, is the intimate connection between the fauna of Persian Azerbaijan, or N. W. Persia generally, and that of Anatolia and Asia Minor generally; this is exemplified by the following species and sub-species:—*Petronia p. exigua*, *Galerida cristata subtaurica*, *Eremophila alpestris penicillata*, *Acredula caudata tephronota* and *Anthoscopus pendulinus persimilis*. The following too belong to this distinctively Western element though they are rather Syrian than Anatolian birds:—*Passer domesticus biblicus*, *Ammomanes deserti (fraterculus ?)*, *Cettia cetti orientalis and Turdus merula syriacus*.

The political frontier between W. Persia and Mesopotamia coincides approximately with an important faunistic boundary, the boundary between the immense Mesopotamian plain and the mountainous country of Kurdistan and Luristan. On the latitude which we are considering (about lat. 34° N) some of the foothills of Persia the frontier into cross Mesopotamia and run N. W. as far as the Fateh gorge on the Tigris; these hills are the Jebel Hamrim: on the whole, however, the political frontier divides the palms of Mesopotamia from the scrub oaks of the Kurdish hills, and we have used the political frontier to divide our Mesopotamian collections, which are being worked out by Dr. C. B. Ticehurst, from our Persian specimens which are the subject of this paper.

Cheesman, Ingoldby and myself all entered Persia at different times by the ancient road which runs from Baghdad to Kermanshah and on to Tehran. The first place at which a few birds were collected was Qasr-i-Shirin (about 1,000 ft.). The gardens irrigated by the Hulawan river are the last place in which date palms are seen, but I failed to find the Mesopotamian Bulbul (*Pycnonotus leucotis mesopotamia*), a bird which is closely associated with the date. The surrounding country is covered with small red hills with a crumbling stony surface: characteristic birds in autumn are a See See Partridge (*Ammoperdix griseogularis ter-meuleni*), a Desert Lark (*Ammomanes desertorum* subspecies), Blue Rock Thrush (*Monticola solitarius transcaspicus*), Rock Doves (*Columba livia*), and the Wheatears (*Œnanthe finschii barnesi* and *O. alboniger*). A very pale fox was also seen commonly. Ingoldby told me that in spring he saw the European Bee Eater (*Merops apiaster*) breeding, and in this and other respects the fauna is quite unlike that of the great plain of Mesopotamia. The road from Qasr-i-Shirin runs up the valley past innumerable little hills, and red ridges to Pa-i-Taq: from here it zigzags up the side of a very steep hill past Taq-i-Girreh to the Karind plain at 5,600 feet. The region between Pa-i-Taq and the top of the pass is clothed with a small scrub-oak with evergreen leaves, walnuts, brambles, etc. Though most of the trees are only six feet high we are here and at Kermanshah in woods inhabited by many of the birds which are characteristic of the Zagros forests, for example the Persian Blue Tit (*Parus cæruleus persicus*), the large pale Rock Nuthatch (*Sitta neumayer dresseri*) which is common on the bare rocks of the Pa-i-Taq pass; Cheesman shot also the desert Rock Sparrow (*Carpospiza brachydactyla*). The See See, which as I have said was common at Qasr-i-Shirin, belongs to the form found in Fars and in Mesopotamia (*A. g. ter-meuleni*) not to the form found in most other parts of Persia.

At the top of the pass the scrub-oaks are left behind, and we enter a long narrow plain, the plain of Karind, shut in by high parallel mountains on either side. This country is mostly under cultivation and is said to receive a higher rainfall than the plains round Hamadan and Qazvin. Where it is not cultivated it is covered with wild liquorice (*Glycerrhiza*). Cheesman saw Black-headed Buntings (*Emberiza melanocephala*) and Red-rumped Swallows (*Hirundo rufula daurica*) in May, and his record of a colony of white Storks (*Ciconia alba*) breeding in a cliff above the village of Karind is particularly interesting. In winter (November 1918) I found the Karind plain singularly devoid of birds. I only saw Ravens (*Corvus corax*) and Magpies (*Pica p. bactriana*), and various common ducks and waders along the banks of the Ab-i-Karind, and in the gardens the Syrian Pied Woodpecker (*Dendrocopus syriacus*), Great Tit (*P. m. blanfordi*), and Corn Bunting (*Emberiza c. calandra*). I climbed to the crest of the Kuh-i-Nur, S. W. of Karind (8,000 ft.) and saw numbers of Chukor (*Alectoris graeca* sub-species), as high as the ridge, Chaffinches (*Fringilla c. cœlebs*) and Yellow Buntings (*Emberiza citrinella erythrogenys*) in flocks up to 7,000 feet and nothing else. It was extremely cold except at midday, but no snow had fallen. From the top one saw ridge after ridge of hills all running N. W. & S. E. and all thinly covered with scrub oak and bushes of various sorts. As I have said many, perhaps most, of the birds of the Zagros forests occur here.

Progress by Ford Van convoy gives plenty of time for collecting but I found exceedingly little between Karind and Kermanshah. I saw four adult Great Bustards (*Otis tardus*) in a little boggy plain at Harunabad among wild liquorice. At Kermanshah I spent seven days (29 Nov.-5 Dec. 1918), and got a number of interesting birds. The margins of the river, the Kara Su, are marshy in places and held duck, common waders, Bittern (*Botaurus stellaris*) and Common Heron (*Ardea c. cinerea*). There were plenty of Ravens (*Corvus corax*) and Sharpe's Crows on the outskirts of the town, and Lämmergeiers (*Gypaëtus barbatus*) were commoner than I saw them elsewhere. Ploughing was in progress all over the country side, but there was a striking absence of birds in the plains: I only saw Sky Larks and a few Crested Larks. In the small wood immediately above the town of Kermanshah I found a most interesting avifauna. Certain birds represented the peculiar fauna of the woods of the Zagros mountains:—the Blue Tit (*Parus cæruleus persicus*), and the Longtailed Tit (*Acredula caudata tephronota*), which is confined so far as Persia is concerned to the S. W.; possibly also the Wren, provisionally ascribed to *Troglodytes t. hyrcanus*, should be identified with the almost unknown *T. t. zagrossiensis*, Zarudny and Loudon, another S. W. Persian form. Other birds of perhaps less interest were abundant. The Blue and Longtailed Tits moved about the wood in association with Persian Great Tits (*P. m. blanfordi*): and *Phylloscopus* sp. Syrian Pied Woodpeckers, Robins, Song Thrushes (*Turdus p. philomelos*), Blackbirds (*T. merula syriacus*), Cetti's Warblers, Grey Wagtails, Woodcock, Common Kingfishers, (*Halcyon smyrnensis*,) and Eagle-Owls (*Bubo b. nikolskii*) were all seen several times. From 26th to 28th May, Cheesman was in Kermanshah: he found Common Bee Eaters, Sharpe's Crow and Cetti's Warbler breeding, the last two with young. Between Kermanshah and Hamadan he obtained evidence of the breeding of Caucasian Starling (*Sturnus vulgaris caucasicus*), White Stork, Swift (*Micropus apus pekinensis*), Crested Lark (*Galerida cristata subtaurica*), Black Kite (*Milous migrans*), Black-headed Bunting, Hoopoe (*Upupa epops epops*). I was at Asadabad for five days in early December 1918, detained by snow on the pass: snow also fell in the camp and broke down some of the tents and we were visited by very severe wind. The only birds I could find were several Starlings (*S. vulgaris* subsp.), and Eversmann's Redstarts (*Phœnicurus erythronota*), one Wren, one Crested Lark, one Little Owl and three Magpies. On the Asadabad pass, and later on the Aveh pass I saw Snow Finches (*Montifringilla nivalis*) between 7,000 and 9,000 feet, on both occasions in December 1918.

At Hamadan (6,000 feet and over) I remained two days, (11th and 12th December 1918), and in spite of brilliant weather only saw Great Tits, Goldfinches (*Car duelis c. hïrmsi*), Syrian Pied Woodpeckers, Crows (probably *C. c. sharpei*), and House Sparrows, all common; a few Eversmann's Redstarts, White Wagtails (*M. a. dukhunensis* ?), and Magpies; one Raven and one Crested Lark. It appeared to me that Aveh would be a good centre for collecting; the mountain above it would be accessible, and also the broken red foothills running down to the plain, and a considerable stream: unfortunately I only remained there a few minutes.

Qazvin in December 1918 and January 1919 was most unpleasant, but at any rate showed one which species could endure the cold (down to 10° F. and sometimes 0° F. at night), and the wind, which was sometimes terrific, and the snow of which there was only a little. The following birds were fairly common, Rook (*Corvus frugilegus*), Persian Wagtail (*Motacilla alba persica*) (of which no specimens were obtained), House Sparrow (*Passer domesticus biblicus*), Great Tit (*P. m. blanfordi*), Black Kite (sp ?), Griffon Vulture (*Gyps fulvus*): the following were seen rarely, Raven, Magpie, Grey Wagtail, Goldfinch (*C. c. hïrmsi*), Common Snipe (*Gallinago cœlestis*), Crested Lark, Linnet (*Acanthis linota fringillirostris*) and Chukor: the following once only, Eversmann's Redstart, Syrian Pied Woodpecker, Golden Eagle (*Aquila chrysœtus*), and Song

Thrush. That is to say I only saw a score of birds in thirty days, most of them rarely. The paucity of the winter avifauna may be compared with what McGregor found at Erzerum in midwinter.

I was in Qazvin again from mid-July till the end of October, and concluded that it is an unpleasant place at the best of times, less so in summer than winter. It appears that several birds breed in Qazvin, but leave it before mid-July, that is to say when it become dry and intensely dusty. I never saw the grey-backed Warbler (*Ædon galactotes familiaris*) nor the Black-headed Bunting (*Emberiza melanocephala.*), both of which we know breed here; nor did I see Cuckoos though Cheesman noticed then a few weeks before.

Migration through Qazvin in autumn is not very noticeable, but my observations were rendered incomplete by malaria. No conspicuous movements were observed in spite of the fact that birds were concentrated in the gardens.

Cheesman collected at Tehran and Gulhek (from below 4,000 feet to above 6,000 feet) between 6 and 18 June and found the following species breeding, or feeding fledged young:—Sharpe's Crow, Magpie, Nightingale (*Luscinia megarhyncha africana*), Blackbird (*T. m. syriacus*), Olivaceous Warbler (*Hypolais pallida elœica*), Great Tit (*P. m. blanfordi*), Roller (*Coracias garrulus* sub-sp.), Common Kestrel (*Falco t. tinnunculus*), Scops Owl (*Otus scops pulchellus*), and a number of common birds. He climbed the mountain immediately N. W. of Tehran on 14th June and reached a height of about 12,000 feet. He observed the following birds:—up to 6,000 ft. Cetti's Warbler and *Œnanthe p. pleschanka*; up to 8,000 ft., Nightingale and Blackbird; up to 10,000 ft. Chukor (*Alectoris graeca*); up to 11,000 ft. Rock Sparrow (*Petronia p. exigua*); up to 12,000 ft. Meadow Bunting (*Emberiza cia par*) and Grey-necked Bunting (*E. buchanani*), Red-fronted Finch (*Serinus pusillus*), Shore Lark (*Eremophila alpestris penicillata*), and Red-tailed Wheatear (*Œnanthe xanthoprymna chrysopygia.*)

Qazvin was our most northerly station in the Iranian highlands and the terrain was typical of all parts of the plateau which we visited, so that this description would apply almost equally well to the country surrounding Kermanshah, Hamadan, Tehran, or Qazvin. The plateau in these parts of Persia lies between 3,500 and 6,000 feet above sea level; it is crossed by numbers of ranges of mountains running from N. W. to S. E.; these mountains form considerable barriers for they contain no great peaks, but consist rather of wall-like ranges, and are not crossed by any low pass. In spite of this the plateau fauna is very uniform, and so far as we know species are never limited to one or other side of one of these ranges. The plains which lie between these hills are of width varying from five miles (Karind plain) to fifty miles or more. The soil is light and extremely stony and it is fertile wherever water is obtainable; boulders and outcrops of rock do not occur in the plains. Great areas are cultivated as soon as the snow has melted, and at this season there is abundant water coming down from the hill sides in stony bedded torrents many of which are dry for eleven months in the year. The principal crops are barley and wheat and the opium poppy is not grown extensively in the part of Persia which we are considering. A little rice is grown near Qazvin in relatively low-lying places, but I believe only one crop is obtained in the season.

In the spring the whole country is a blaze of wild flowers, a great number of species blossoming simultaneously soon after the Persian New Year's Day (March 25). Insect life is also concentrated at this season, and as I have said some of the summer birds which resort to the plateau to breed appear to remain there the shortest time possible, and depart before the middle of July, presumably as soon as their young are fledged. Before June is out the land is parched and the plants look like herbarium specimens, and they remain in this condition becoming more and more abraided by wind and dust till the rain and snow falls about Christmas time. During summer violent winds and dust devils are

prevalent in many places, and as they are loaded with dust and grit they add greatly to the discomfort of life. Rain and snow fall in winter and spring, and snow lies for weeks on end in January and February except in the lowest parts of the plateau. Apart from precipitation, water is carried from the hills far into the plains by under-ground tunnels known as Qanats, which are constructed by sinking a chain of wells in a line sometimes twenty miles long, and connecting the bottoms of the wells by a nearly horizontal tunnel. The wells are stone lined and frequented by Rock Pigeons and Rock Sparrows. The water channel reaches the surface far out in the plain and irrigates vineyards and groves of trees and gardens. In such places nearly all the European fruits and vegetables are grown. The sides of the irrigation runnels are planted with poplar and plane trees which constitute practically the whole of the timber and wood fuel of the country.

The high dry and stony plateau which I have described is limited on the north by the chain of the Elburz. These mountains are bare and rocky on their south side, but thickly afforested on the north, the side which receives an almost perennial rainfall from the damp winds which below across the Caspian. The frontier between the forest and the desert is extremely sharply defined and the transition between the two faunas and floras is probably one of the most sudden that can be seen in any country. I was so fortunate as to stop several times at Menjil, a point at which this frontier may be studied. Menjil (alt. 1,200 feet) is in the desert or semi-desert country, but so close to its edge that in two hours one can walk into the forest. I passed rapidly through Menjil in January, but was there for a few days in March and April and also later in the summer. In the fields and among the stones Crested Larks bred; probably Sky Larks, Linnets and Corn Buntings bred also. Choughs were about in flocks, and Griffons, Egyptian Vultures (*Neophron percnopterus*) and Lämmergeiers were fairly common. See See (*A. g. griseogularis*) and Chukor were abundant among the rocks, and I shot the small Rock Nuthatch (*Sitta r. rupicola*) and the larger *S. neumayer obscura* without realizing how interesting they were. Crag Martins (*Riparia rupestris*) and Blue Rock Thrushes were common enough. Thus far the fauna was that of the stony desert and the stony hills of the plateau. But when one entered the forest all these forms were left behind and at once one found such types as the Cole Tit (*Parus ater qaddi*), Nuthatches (*Sitta europœa rubiginosa*), Green Woodpeckers (*Picus viridis karelini*), Meadow Buntings (*Emberiza cia par*), Jays (*Garrulus glandarius hyrcanus*), Blackbirds (*Turdus merula aterrimus*), and Great Tits (*P. m. major*). These are all of them species or sub-species which I had not seen before, and as I afterwards discovered the first four of them are characteristic not of the Caspian forests in general, but of the dry forests only. The great difference between the dry and the wet types of forest has not I think been previously noticed, but so far as the fauna is concerned it is of considerable importance. I saw dry forest near Menjil and also at Noglabar. It grows on the slopes of the hills and generally consists of mixed decidous trees, (mainly oaks with a few beeches and other trees) scattered rather sparsely over well-drained ground. Flowers are abundant in spring, blue anemonies, squills, &c., but in winter the ground is frequently snow covered. The upper limit of this open forest is reached at about 6,000 feet, where it is succeeded by thick beech-scrub. At about 7,000 feet one emerges upon open turf downs with a few juniper bushes.

The great forest which we have now entered may be divided as I have said into dry and wet belts, but this is a secondary matter. It is one continuous forest circling the south end of the Caspian Sea, stretching from near Lenkoran to Asterabad without interruption and presenting in every way a most marked contrast to the desert region. It is scantily wooded on the hills, densely in the maritime plain, and watered by a heavy rainfall distributed through most of the months of the year.

A list of nearly three dozen birds can be made out, each represented by a different sub-species in the plateau and the forest. Generally the desert race is pale or buff, as is so often the case. The forest race is either that typical of central Europe, or dark and saturated in colour.

The road north from Menjil runs through dry forests past Noglabar until the lowest of the foothills is passed, and before it reaches Resht it enters the wet forest. This covers the flat country and grows from wet and frequently black water-logged ground. Its altitude is very little above the Caspian level and it is probably all of it below mean sea level. The trees are more luxuriant, more closely packed and more covered with creepers than those in the dry forest. In fact the general appearance is not unlike that of a tropical rain forest in Equatorial Africa or the West Indies, until one examines the great trees and finds that they belong to well-known European genera (*Fagus*, *Alnus*, &c.,) and that the creepers which climb high into their crowns are such well-known things as *Clematis*, *Rubus and Smilax*. The wet forest is never under snow for more than a few hours, though Woosnam encountered 2 feet of snow at Resht in the first week of February. The men who inhabit this region of wet forest raise great quantities of rice and deep-cut irrigation channels run in all directions: these and the denseness of the forest and the intense wetness of everything make exploration difficult. Until the war there was an extensive silk raising industry, and plantations of mulberry are common. Oranges and lemons are grown here in profusion, also cherries and large garden strawberries: there are one or two experimental tea gardens. It appears that conditions are uniform as regards climate, vegetation and animal life along the whole S. W. & S. shore of the Caspian, and Satunin's (1905) account of the low-lying marsh and forest of the Talish is true in all essentials of Gilan and probably Mazandaran. Apart from the forest there are the lagoons, of which there is a fine example between Resht and Enzeli. The water is brackish near the sea, but fresh on the Resht side. The lagoon is fringed by reed beds and bramble thickets and in places the shore is flat and muddy. Similar lagoons are found here and there all along the coast; some are a few acres only in extent and are blocked with reeds, others like Asterabad Bay and the Resht-Enzeli lagoon are ten or twenty miles across. They are all at Caspian Sea level and in the majority of cases lie a few hundred yards back from the shore. Between the lagoon and the sea is a tract of grazing land with scattered low trees of the thorny *Gleditschia*, Whitethorn, Medlar, &c. The actual sea coast at Enzeli, but not on the Talish is bounded by sand-dunes.

I myself spent seven months at Resht and Enzeli and travelled along the coast from Astara to Enzeli: Cheesman was in Enzeli in June: Ingoldby was in Resht and Enzeli in the winter and also at Bandar-i-Gez in Asterabad Bay. Our ornithological results were frankly disappointing. This was in part due to a so-called war with Kuchik Khan, a local insurgent; this war lasted through the spring and prevented one from leaving Enzeli during the nesting season: but apart from this the dense forest resembles similar country in most other parts of the world and has an extremely poor fauna, at any rate in summer. We saw enough of the lowlands and the wet forest to feel confident in recommending travellers to get quickly away from Resht and Enzeli. The wet forest is now fairly well known, not as a result of our work only, but of that of Zarudny and of Woosman (Witherby 1910). The dry forest is more attractive and less known and this applies particularly to the Talish hinterland, which would be most interesting country to visit. The Talish tribesmen have a bad name and speak an almost unknown language, but I formed the opinion that they would give little trouble if they were sure that the traveller were neither a Persian official nor a Russian.

The following birds are all more or less common, and all resident round Resht and Enzeli; they indicate the extremely European nature of the fauna—Sharpe's Crow, Magpie (*P. p. bactriana*), Jay, Chaffinch, Tree Sparrow (*Passer*

montanus transcaucasicus), Great Tit (*Parus m. major*), Blue Tit (*Parus cæruleus raddei*), Long Tailed Tit (*Acredula caudata alpina*), Robin (*Erithacus rubecula hyrcanus*), Song Thrush, Blackbird (*Turdus merula aterrimus*), Wren (*Troglodytes troglodytes* sub-sp. ?), Great Spotted Woodpecker (*Dendrocopus major pœlzami*), Black Kite, Sea Eagle (*Haliaëtus albicilla*), Tawny Owl (*Strix aluco*), Pheasant (*Phasianus colchicus talyschensis*). The commonest winter visitors in the forests are the Rook, Starling (*Sturnus vulgaris caucasicus* and *poltaratskyi*), Goldfinch (*Carduelis c. loudoni*), Fieldfare (*Turdus pilaris*), Robin (*E.r. caucasicus*), and Woodcock (*Scolopax rusticola*). The following species are summer visitors and breed:—Osprey (*Pandion haliaëtus*), Hobby (*Falco s. subbuteo*), Roller (*Coracias garrulus* sub-sp. ?), Swallow (*Hirundo rustica*) Nightingale (*Luscinia megarhynchus africana*), Olivaceous Warbler (*Hypolais pallida elœica*), and Red-backed Shrike (*Lanius collurio*).

In the reed beds around the lagoons the Common Cormorant (*Phalacrocorax carbo*) and the Little Grebe (*Podiceps ruficollis capensis*) are common and resident, also Montague's Harrier, Gallinule (*Porphyrio poliocephalus seistanicus*), Common Heron, three or four other Herons in all probability, and the Moustached Sedge Warbler (*Lusciniola melanopogon mimica*). The Common Kingfisher (*Alcedo athis pallasii*) is resident and breeds round the margin of the lagoons. In summer the Purple Heron (*Ardea purpurea*) comes to the reed beds and no doubt breeds, as also does the Great Reed Warbler (*Acrocephalus arundinaceus zarudnyi*). Some of the islands in the lagoon have extensive bramble bushes among the rough grass, and in these bushes the Large-billed Reed Bunting, (*Emberiza pyrrhuloides korejewi*), and the Reed Warbler (*Acrocephalus scirpaceus macronyx*), and the Black-headed Wagtail (*Motacilla flava feldeggi*) make their nests. In winter the lagoon and its surroundings were alive with fowl. On the open water and in the smaller marshes were immense numbers of duck, geese and gulls, the species of which are dealt with in the second part of the paper; also Coot (*Fulica atra*), Great Crested Grebe (*Podiceps cristatus*) and Pygmy Cormorants (*Phalacrocorax pygmæus*); on the mud banks small waders of various sorts were never very common and never interesting; in the marshes and paddy fields one found hosts of Common Snipe, and large numbers of Jack Snipe, and in the reed beds the most abundant bird was the Common Reed Bunting (*Emberiza s. schœniclus*). The open sea was generally thickly spattered with duck in winter, specially the diving and maritime ducks: the sandy shore was at all seasons disappointing. At any time of year it held Sea Eagles and Common Cormorants, and on migration small numbers of waders, generally common species, rested on it. The Lesser Ringed Plover (*Charadrius dubius*) bred just above the level of the sea water on sand with a few small pebbles.

I shall now discuss the species individually.

Corvus corax, L.—The Raven was common round towns and villages from Karind to Manjil in winter. In spring it retreats to the ranges of hills in which it remains common. It was never seen North of Manjil at any season. The specimens I obtained have failed to reach home.

Corvus cornix cornix, L.—Hooded Crow.

1 ♂, Qazvin—31st December 1918.
1 ♀, Resht—23rd February 1919.

The Hooded Crow is no doubt a winter visitor to the S. shore of the Caspian. I also saw it in mid-winter at Qazvin, and I believe that mixed flocks of this and Sharpe's Crow occurred there at that season.

Zarudny records the Hooded Crow as resident in the Caspian Provinces of Persia. I think that this must be an error, for we know that Sharpe's Crow occurs there, but it is exceedingly desirable that some one should obtain a series of breeding birds from the Caspian litoral and the plateau. (Wing 310 mm. ♂; 300 mm. ♀; culmen 52 mm. ♂; 50 mm. ♀).

Corvus cornix sharpii, Oates.—Sharpe's Crow.

Imm. ♀ 8th June, Gulahek, Teheran. (R. E. C.)

Iris blue-grey, feet black, bill grey-horn.

I have re-examined Woosnam's specimens from the South coast of the Caspian, shot in March. Witherby is undoubtedly correct in identifying them as *C. c. sharpii*. I take it then that the grey Crow breeding in the Caspian Provinces is Sharpe's and not the Hooded Crow, in spite of Zarudny's statement that *C. c. cornix* is resident here. Crows which I believe were *C. c. sharpii* bred commonly at Enzeli—lining nests 14 March, several nests still empty 10th April, feathered young fell from nest 27th April. Young were flying about in numbers by the end of May. In the plateau Cheesman found young fledged in nest 25th May, Kermanshah, and saw them flying about 6th June, Teheran. We do not know were the boundary lies between the breeding ranges of *C. c. sharpii* and *C. c. capellanus*, which breeds in Mesopotamia, and which is always associated, in my mind at any rate with the Date Palm.

Corvus frugilegus, L.—Rook.

A very few small parties of rooks were seen between Kermanshah and Qazvin in December 1918. At Qazvin they breed in numbers in the town, in plane and poplar trees: presumably these rooks are *C. f. tschusii*, Hart., but no skins are available. The rook is abundant at Qazvin at all seasons.

Rooks are abundant at Resht and Enzeli in winter. They completely disappeared in the second half of March.

Colœus monedula, L.—Jackdaw.

Jackdaws appeared at Qazvin on 18th October 1919. They were completely absent in summer, and by no means common in winter. I never saw them between the frontier and Hamadan in November and December 1918.

The specimens seen appeared to belong to the race generally known as *collaris* (Drummond), a name which must be replaced by the earlier *Sœmmeringii* (Fischer).

Pica pica bactriana, Bp.—Magpie.

1 ♂, Karind—November 1918.
2 ♀, Resht—January February.

The Magpie was seen in all parts of Persia which we visited, from the frontier to the Caspian. It was common in most of the gardens and small woods of the plateau, and extremely common in Gilan; in all places it appeared to be resident. Besides these specimens I have had the pleasure of examining a series of twelve Magpies collected by Lieut-Col. J. E. B. Hotson, at and near Shiraz. The wings of the males measure 198-208 mm, of the females 196-209 mm, and one exceptionally small specimen 188; my male from Karind measures 207, and one female from Resht 190. It is evident that the great development of white in the primaries is a more constant character than the broadly white rump: the presence or absence of white at the bases of the chin feathers is very variable, and useless as a sub-specific character. Though Magpies are to some extent variable birds it should always I think be possible to separate *P. p. bactriana* from the typical race, even if only a single skin is available. Zarudny records the Magpie of N. &. W. Persia (the Caspian Province included) as "*P. pica*", that of S. & E. Persia as *P. p. bactriana*, but my Resht specimens appear to be definitely *P. p. bactriana*.

Garrulus glandarius hyrcanus, Blanf.—Jay.

1 ♀, 19th February (Wing 159 mm.) Resht.
1 ♂, Tula Rud, Persian Talish, sea level, 6th July (wing 173 mm).

I found the Jay of Gilan and Mazanderan common in the dry forests on hillsides at Menjil, and Noglabar; also in the wet forests round Resht and in the equally wet forests of the Persian Talish below mean sea level.

G. g. hyrcanus is quite different from *G. g. caspius*, but their distribution is very puzzling. We have skins of *hyrcanus* from Mazanderan shot as high as 6,500 ft. by Blandford (Brit. Mus.) and we know it occurs also as low as the shores of the Caspian. Westwards it is common in many parts of Gilan, and I obtained it at Tula Rud, in the Persian Talish; Satunin (1912) recorded this sub-species from the Russian Talish; now the Russian and Persian Talish forms one forest, continuous with the forests of Gilan and Mazanderan.

Satunin states that *G. g. caspius* and *G. g. hyrcanus* have "different distribution in altitude in the Russian Talish"; but does not state which occurs above the other. However we know from my specimen that *G. g. hyrcanus* occurs at sea level in the Persian Talish, so we must presume that *G. g. caspius* is a bird of the high-lying forests of the interior. This is curious if it is the case, for as I have said *G. g. hyrcanus* occurs as high as 6,500 ft. in Mazanderan. *G. g. caspius* is unknown in Persia except for Zarudny's vague statement that it is a "rare resident" in the region South of the Caspian, or apparently from anywhere except "Lenkoran", the type locality. The only skins of *G. g. caspius* I have been able to examine (one at Tring, two at Brit. Mus.) were obtained from the dealer Tancrè many years ago, and are labelled "Lenkoran." They may of course have come from almost any distance up country.

Pyrrhocorax pyrrhocorax—(L.) Common Chough.

1 ♀, Menjil—22nd March.

The Common or Red-billed Chough is apparently resident in places where there are high crags; Kermanshah and Menjil (P. A. B.) and Bisatun, 28th May (R. E. C.). The wing of this female measured 288 mm., the culman 49. mm. The Alpine or Yellow-billed Chough was never seen.

Pastor roseus (L.)—Rosy Pastor.

1 ♂, 2 ♀. Enzeli.—2nd May.
1 ♂, Enzeli.—14th June.
2 ♂, Qazvin—19-20 June (R. E. C.)

Rosy Pastors appeared at Enzeli on 2nd May 1919 in flocks which consisted of adult males and females. These small mixed flocks remained about until 18th June. The testes of the males shot on 2nd May and 14th June were very large, and the ovaries of the females (2nd May) slightly enlarged. Presumably the birds bred locally, but I entirely failed to find any evidence of their doing so. Cheesman's males from Qazvin also had greatly enlarged testes though they were shot from flocks consisting of adult males and females, which were eating the white mulberries. At the end of July I saw large flocks of old and young birds in gardens at Qazvin. It is surely very unusual for males and females of any bird to be in flocks, at the actual breeding season. Mr. Stuart Baker informs me that males and females of the common Indian Mynah (*Acridotheres tristis*) flock in the early morning and late evening, even in the breeding season, and that the Bank Mynah (*A. ginginianus*) does the same.

Sturnus vulgaris caucasicus,—Lorenz. Starling.

2 ♂, 2 ♀. Resht—January February.
2 ♂, Enzeli—15th March.
1 ♀, 1 imm. Kangavar—28th May (R. E. C.).
1 ♀, Qazvin- 20th June (R. E. C.).

S. v. poltaratskyi, Finsch.

1 ♀, Enzeli—15th March.

All my Starlings have been submitted to Dr. Hartert, who has determined them as above. In winter Starlings are common in flocks at Qazvin and fairly common at Resht and Enzeli: the last date on which I saw them in the latter places was 20th March. They were entirely absent until 25th June when flocks of adults and young appeared. Cheesman found *S. v. caucasicus* breeding at Qasr-i-Shirin, and feeding fledged young at Kangavar on 28th May. He

also saw flocks of adults and juveniles at Qazvin on 20th June. A series of breeding birds from any part of Mesopotamia or Persia is particularly desirable, as a large number of very closely allied local forms have been described and at present we know very little about the variation of this species in any one locality.

Chloris chloris chloris (L.)—Greenfinch.

1 ♂, Noglabar—3rd March.

Greenfinches were common round Noglabar in early March and were "singing". I have no other record. The specimen agrees exactly with the typical sub-species, which Zarudny has already recorded as resident in N. W. Persia and the Caspian Provinces.

Carduelis cannabina fringillirostris (Bp. and Schl.) (?)—Zinnet.

4 ♂, Qazvin—December 1918 and January 1919.

A race of the Linnet was not rare at Qazvin in December 1918, and January 1919 small flocks sheltering from the terrific wind in corners of gardens and similar places. I saw Linnets at Resht in the winter and found them preparing to breed at Menjil 7th April.

Zarudny records both *C. cannabina fringillirostris* and *C. c. cannabina* as breeding birds in many parts of N. Persia, from the N. W. to Khorassan. Hartert does not record *C. c. cannabina* in Asia at all. These birds are all much paler on the upper parts than winter skins from Britain and Western Europe, and can at once be separated from such skins. The wings measure only 81, 81, 82, 84 mm., which is less than the usual measurements of *A. c. fringilli rostris*, to which race however I refer them by reason of their colour.

Carduelis carduelis härmsi (Zarudny).—Goldfinch.

2 ♀, Hamadan—12th December 1918.

1 ♂, Menjil—March.

Carduelis carduelis loudoni, Zarudny.

4 ♂, 2 ♀, Resht.—January-February.

Goldfinches were fairly common in winter at Karind, Hamadan and other places along the road through the plateau; they frequented gardens and were generally seen in quite small parties, or even a pair only. They belonged no doubt to the race which breeds in the plateau, and which Cheesman saw feeding fully fledged young at Taq-i-Girreh, on 24th May. I also found the same race at Menjil early in April in small flocks in the olive trees. Goldfinches are reported to breed quite commonly at Qazvin. At Resht an entirely different race of Goldfinch is found in the winter, frequenting the wet pastures in flocks numbering many hundreds and often thousands. Most of these flocks left Resht in the middle of March, but I saw one party at Enzeli as late as 14th April.

There is not the least difficulty in separating these two sub-species, the one which we believe to be resident in the plateau, and the other which occurs in huge flocks in winter round Resht. The first is small, the wings of the females from Hamadan measuring 75-76 mm., of the male from Menjil 77 mm.; the colour of the back is grey-brown, and the rump grey, not white; one encounters great difficulties when one attempts to unravel the nomenclature of the Persian Goldfinches in order to name this race. Dr. Hartert is of opinion that they are probably *Carduelis c. härmsi*, Zarudny, described from specimens shot at Baku in April; I have seen no specimens from Baku, but at any rate for the present this name may be accepted for the plateau Goldfinch. The synonomy of this race is complicated by the fact that Zarudny first described it as "*Carduelis elegans brevirostris* or *C. elangans minor*" (1889); in 1893 he referred to it as *Carduelis minor*, Zarudny; and in 1911 (b) he renamed it *Acanthis härmsi*, because the names *brevirostris* and *minor* were both pre-occupied in the genus. As it is a sub-species of the Common Goldfinch we must speak of it as *Carduelis c. härmsi*. The second race that which occurs at Resht in winter, is very similar to *C. c. carduelis* both in size and in the colour of the back, but

the patches on the sides of the chest are dull brown, not red brown, and the red of the head is a crimson red, not a fiery red as it is in the type. In both these respects my specimens agree exactly with a short series labelled "*C. c. loudoni*, Zarudny" and collected by Baron Loudon himself in winter in the Russian Talish, a forest district close to the Persian frontier, on the S. W. side of the Caspian. The identity of this second race seems definitely established, if we can presume that Baron Loudon knew the race named *loudoni* by Zarudny. My specimens of *C. c. loudoni* have wing measurements as follows: 4 ♂ 77-81 mm. 2 ♀ 77,78 mm. Three males collected by Loudon in the Persian Talish measure 79·5-81 mm., one female 76·5. It is to be hoped that members of the Society stationed in Persia will lose no opportunity of collecting long series of Goldfinches at every time of year. At present it is well nigh impossible to identify our specimens owing partly to the lack of others for comparison, partly also it must be owned to the number of races which have been described by Zarudny. Apart from the races to which I have referred this author has described *blanfordi* and *iranensis* from parts of Persia, and in his paper published in 1911 he adds "*C. carduelis, C. c. volgensis, C. c. major, C. minor, C. orientalis* and *C. caniceps orientalis*" to the forms which either migrate through or winter in various parts of Northern Persia. Small wonder that sub-species are in bad odour in certain quarters!

Serinus pusillus (Pall.) Red-fronted Finch.

1 ♂, Elburz Mountains near Tehran, 16 June (R.E.C.).

The Redfronted Finch probably breeds in all the gorges and bushy valleys of the Elburz. We do not know if it is there in winter. I saw it at about 3,000 feet near Menjil on 27 March, Cheesman up to 12,000 feet in the mountains just behind Tehran on the 16th June, "feeding on low ground plants near mountain spring—crop and gizzard full of white kernels of seeds." (R.E.C.)

Fringilla cœlebs cœlebs, L.—Chaffinch.

1 ♂, Kermanshah—30th November 1918. Wing 86 mm.
1 ♂, Resht.—26th February. Wing 92 mm.
1 ♂, Enzeli—14th June. Wing 85 mm.
1 ♂, Enzeli—30th June (R. E. C.) Wing 85 mm.

The Chaffinch was common above Karind up to 7,000 feet on 26th November 1918, also at Kermanshah. I did not see it at Hamadan or Qazvin in midwinter. In the lowlying Caspian Provinces it is abundant in winter (Resht, Enzeli) but the great majority leave in the last part of March. No nests were found, but the males shot on 6th June and 30th June (R.E.C.) were in full song with much enlarged testes. I saw a large family party at Astara, in the Talish district, on the Caspian litoral, on 3rd July.

Montifringilla nivalis (L.)—Snow Finch.

I saw Snow Finches in December 1918, always above 7,000 feet, on the Asadabad and Avah Passes. It is interesting to see how high this bird remains even in winter in spite of the snow and the wind.

Petronia petronia exiguus (Hellm.).—Rock Sparrow.

1 ♂, 1 ♀, Tochal, Elburz Mts. near Tehran, 16th June. (R.E.C.).

This race of the Rock Sparrow was observed by Cheesman breeding in high cliffs, at from 8,000—11,000 feet. The wings measure ♂ 100 mm. and ♀ 98 mm, so that the measurement agree with *P. p. exiguus*, which has already been recorded by Zarudny and Härms (1913) from this part of Persia, but not other parts; it is the form which occurs in the Caucasus and Armenia.

References to "Zarudny" and to "Hartert" when not followed by a date refer to Zarudny's paper 1911 *a* (see Bibliography) and Hartert's *Vog. pal. Fauna*.

Carpospiza brachydactyla, Bp.—Desert Rock Sparrow.

The Desert Rock Sparrow was noticed by Cheesman at Taq-i-Girreh, "evidently breeding" on 24th May.

Passer domesticus domesticus (L).—House Sparrow.

2♂, 1 ♀, Enzeli. March.

Passer domesticus biblicus, Hartert.

7♂, Qazvin—January.

1♀, Qazvin—January.

The House Sparrow of the South Coast of the Caspian except perhaps the Eastern end, belongs to the typical race. Apart from the above 2♂, 1♀, I have examined 4♂, 1♀ in the British Museum collected by St. John and by Woosnam. Wing of males measure 74-77 mm. and all are grey cheeked with the exception of one ♂ collected by Woosnam on the "S. Coast of the Caspian Sea." As Woosnam traversed the coastal country as far east as Bandar-i-Gaz in Asterabad Bay, this single white cheeked specimen (wing 75), may have come from the extreme S. E. Caspian. Hartert (p. 148) suggests that in Transcaspia we may find intermediate stages between *P. d. domesticus* and *P. d. indicus*. It will be seen that I disagree with Witherby (1910) who records Woosnam's specimens as *P. d. indicus*. Zarudny (1913) has already recorded *P. d. domesticus* and intergrades between it and *P. d. indicus* from Gilan and Mazandaran.

The House Sparrows collected at Qazvin from flocks frequenting stables in midwinter are larger than those from Gilan. The whole upper surface is much more unicolorous than that of either *P. d. indicus* or *P. d. domesticus* at the same time of year. In this respect they agree with winter skins from Palestine, and as their wings measure 79-83 mm. (average 80·25 seven males) I record them without hesitation as *Passer domesticus biblicus*, Hartert, a bird at present only known from Syria and Palestine. Zarudny records *P. d. indicus* as the prevalent sparrow in N. W. Persia exclusive of the Caspian litoral. His paper was published before Hartert described *P. d. biblicus* but he should have avoided this error as the sparrow of this region is grey-checked and large, *P. d. indicus* is small and nearly always white cheeked. House sparrows are common but not abundant in the towns of North Persia. I never saw any sign of their interbreeding with the Spanish Sparrows near Enzeli. I have already recorded (1920) that hen House Sparrows were feeding their young near Enzeli on the very prevalent larvæ of the painted Lady Butterfly (*Vanessa cardui*); one might have supposed that so spiny a larva would be distasteful, but they appeared to choose it in preference to other abundant insects.

Passer hispaniolensis transcaspicus, Tschusi.—Spanish Sparrow.

1♂ Enzeli—March.

The Spanish Sparrow was resident at Enzeli, but only in very small numbers: it frequented isolated fisherman's huts along the sea shore.

Passer montanus transcaucasicus, Buturlin.—Tree Sparrow.

2♂, Resht—February.

1♂, Enzeli—June.

1♂, Enzeli.—June (R.E.C.).

This race of the Tree Sparrow was described by Buturlin (1906) from Akhalzikh. Zarudny and Härms (1913) state that the Tree Sparrow found all along the S. shore of the Caspian from Lenkoran to Bandar-i-Gaz belongs to this race. I have compared the above three specimens, also three collected by Woosnam on the S. coast of the Caspian, and one from the Tortum river between Eizerum and the Black Sea with a large series of the typical race. I find that they certainly are paler on the back when seen in series, but that the difference is very slight and that there is some overlapping. I can detect no difference between the two sub-species in size of bill, but the wings of these specimens are short

(wings of males from Caspian provinces 66, 68, 69,69, 69, 72 mm, female 68). A female from Tortum River 66. Hartert gives ♂73-76, ♀69-72 as measurements of *P. m. montanus*. I have not been able to compare these N. Persian skins with any from Caucasia, and provisionally refer them to *transcaucasicus*, Buturlin, relying on Zarudny and Härm's identification.

Tree Sparrows are locally common round Enzeli and Resht, and breed.

Emberiza calandra calandra, L.—Corn Bunting.

1 ♀, Resht—January.

The Corn Bunting was seen at Karind in November 1918, and at Resht and Enzeli in occasional small flocks from January to March. At Menjil on 7th April it appeared to be paired; I found no nest, and was not in the locality later in the month.

Emberiza citrinella erythrogenys, Brehm.—Yellow Hammer.

2 ♂, 1 ♀, Resht—January-February.
1 ♂, Karind—November 1918.

This eastern race of the Yellow Hammer was first met with at Karind where I found small flocks at the end of November. At Enzeli and Resht it is common in winter, but I never saw it after the end of February. Zarudny states that it breeds in the Caspian Provinces of Persia.

Emberiza melanocephala, Scop.—Black-headed Bunting.

1 ♂, Karind—25th May (R. E. C.).

Cheesman saw the Black-headed Bunting in May at Karind and found a nest ready for eggs at Hamadan on the 30th. He also noted it as breeding at Teheran. I was at Qazvin from mid July until the autumn and never saw the bird.

Emberiza hortulana, L.—Ortolan.

3 ♂, Enzeli—28-30th April.

Small flocks of male Ortolans appeared at Enzeli on 28th April. Both sexes were common in the bushes among the sand dunes till mid May, after which I never saw them. They very likely breed on the slopes of the Elburz, but I do not think do so in the lowlying coastal country.

Emberiza buchanani, Blyth.—Grey-necked Bunting.

(*Emberiza huttoni*, Blyth.)

1 ♂, Tochal, Elburz Mountains, near Tehran, 16th June (R.E.C.).

I never met the Grey-necked Bunting. Cheesman's notes are:—"sings on rocks, twice on one note then 2 or 3 times on a lower note easily recognized as a bunting song. Several seen at 12,000 ft., but not at lower elevations, and only on bare mountain side with rocks and low vegetation. In distance is indistinguishable from *E. hortulana*: organs advanced, apparently breeding."

Emberiza cia par, Hartert.—Meadow Bunting.

2 ♂, Menjil—27th March.
1 ♂, Menjil—15th July.
1 ♀, Elburz Mts., Tehran 12,000 ft., 16th June. (R.E.C.)

I found this race of the Meadow Bunting above Menjil, both in open oak forest and also above the tree-line among Juniper bushes (7,000 ft.). The birds were paired, 27th March. Cheesman's specimen was shot at 12,000 ft. and contained "an unformed egg in the ovary. Iris brown, bill dark horn, legs light horn."

The specimens agree with the type of *E. cia par* at Tring.

Emberiza schœniclus schœniclus (L.) Common Reed Bunting.

1 ♂, 2 ♀, Resht and Enzeli. February.

The Common Reed-Bunting was common in reeds and bramble bushes round the lagoons in winter. The birds disappeared during the last fortnight in March

and had not apparently returned when I passed through Enzeli on 31st October. These specimens have been examined by Dr. Hartert who says he cannot separate them from typical *E. s. schœniclus.*

Emberiza pyrrhuloides korejewi (Zarudny.)—Large-billed Reed Bunting.

3♂, 2♀, Enzeli—18th April-27th June.

2♂, (1 imm.)—Enzeli 28th June.

This race of the Large-billed Reed Bunting, which is already known from Seistan and Syria, was first noticed at Enzeli on 17th April. The birds frequented bramble bushes on the reedy islands of the Enzeli lagoon and were common. I took a clutch of 5 eggs half incubated on 27th June and next day Cheesman shot a young male in first plumage. This clutch has been described by Jourdain (1920). Zarudny only records *E. p. korejewi* from Seistan and S. Baluchistan. He records the typical race as resident on the Caspian litoral. Dr. Hartert has however compared my specimens with some collected by Zarudny himself in Seistan and refers them to *E. p. korejewi.*

Ammomanes deserti, sub-sp ? —Desert Lark.

1♀, Qasr-i-Shirin—24th November 1918.

This species of Desert Lark was quite abundant at Qasr-i-Shirin at the time of my visit. I never saw it elsewhere.

The single specimen obtained is quite unlike any in the British or Tring Museums. It is closest to *A. d. fraterculus*, Tristr, but is not so pale as that in the same plumage, and the underside and wing coverts in my bird are very much redder; the bill is very short and thick. A specimen collected by Woosnam in April at Ram Hormuz in S. W. Persia is indistinguishable from *A. d. fraterculus* from Palestine, and this form also occurs at Takrit, R. Tigris, in summer (C. B. Ticehurst.).

Galerida cristata subtaurica, Kolibay.—Crested Lark.

2♂, 1♀, Menjil—April, (breeding).

1♀, Hasanabad—29th May, breeding (R. E. C.).

2♂, 2♀. Qazvin—December 1918, and January 1919.

1♂, Qasr-i-Shirin—24th November 1918.

The specimens of the Crested Lark agree completely with two in the Tring Museum from Eregli in the Cilician Taurus. Crested Larks from Eregli have been described by Kollibay (1912) as *Galerida cristata subtaurica.*

These specimens show that *G. c. subtaurica* is intermediate in size and in colour between *G. c. caucasica*, Tacz (Lagodechi, Caucasia) and *G. c. magna*, Hume (Yarkand). It is darker than *G. c. magna* with the feathers of the crown and back more darkly centered; the streaks on the breast and sides of the neck are also heavier than in *magna* at the same time of year. On the other hand the general tone is brown and buff as in *magna*, not grey as in *caucasica.* The ♀ bills of *subtaurica* in dried skins are much darker than they are in *magna.*

Dimensions: wings 5♂ 105-114 mm. (average 109) 4♀ 100-103 (average 101). length of bill ♂ 16-17.5, ♀ 14.5-16.5: of *G. c. magna* ♂ 15.5-18.5, ♀ 16-18 mm. and *G. c. caucasica* ♂ 15-17, ♀ 15-16 mm.

Zarudny noticed that the Crested Lark of N. W. Persia was different from *G. c. magna* in Eastern Persia, but he made the mistake of identifying it with *G. c. caucasica.* Woosnam's specimens from Shalamzar, S. W. of Ispahan, and from the Elburz Mountains are in the British Museum: they undoubtedly belong to *G. c. subtaurica.* Witherby (1907, 1910) recorded them as *G. c. magna*, a very natural mistake to make when skins from Western Asia were even scarcer than they are now. On the other hand Witherby's skins from Fars (Witherby 1903) and Woosnam's from Ahwaz (Witherby 1907) are certainly not *G. c. subtaurica* and his identification of them as *G. c. magna* can probably rest, for the moment at any rate. So far as we know therefore *G. c. subtaurica* occurs in N. W. and W. Persia, but not in other parts of the country.

The Crested Lark was present and generally common at all the places we visited in Persia, with the exception of the forests of Gilan and Mazandaran. I once saw a small party at Resht, in January. It is tempting to suppose that they were winter migrants of *G. c. caucasica*, Tacz, from Transcaucasia; at any rate I am sure that the Crested Lark is not a resident in the wet country round Resht. Even in the windiest weather in mid-winter this bird can still be found in the desert round Qazvin. I found a nest with four eggs, the bird sitting at Menjil on 31st March; Cheesman noticed it "obviously breeding" at Hassanabad on 29th May.

Alauda arvensis cinerascens, Ehmcke.—Eastern Sky Lark.
1 ♂, Qasr-i-Shirin—24th November 1918.
1 ♂, Enzeli—1st March.
1 ♀, Menjil—7th April.
1 ♀, Enzeli—15th October.

The Eastern Sky Lark was observed in November and December at many places between Qasr-i-Shirin and Qazvin; in the higher places, Hamadan and Qazvin it is distinctly rare at this time of year. I never saw the species at Resht or Enzeli in the winter, but on 1st March small parties appeared on the shore at Enzeli and in mid-October they were again common at the same place. The bird does not breed in the low country which borders the Caspian. I saw numbers of pairs of Sky Larks at Menjil on 7th April, and they were certainly breeding among the young wheat, but I did not find a nest. The female shot had an enlarged ovary.

Eremophila alpestris penicillata (Gould).
1 ♂, 1 ♀. Elburz Mountains, near Tehran, 16th June (R. E. C.).

One pair noticed among low plants on bare mountain side, 12,000 ft., organs advanced, two half-developed eggs in ovary of females. These exceedingly worn skins belong to *E. a. penicillata* (Caucasus and Asia Minor) and not to *E. a. albigula* (E. Persia &c.); those in the British Museum collected by Woosnam in the Elburz and at Ardal, S. W. of Ispahan, and in the Feridan district N. W. of Ispahan are also *penicillata*. The presence of this bird in Western Persia has already been recorded by Zarudny and by Witherby (1910), but Hartert only records it from the Caucasus and Asia Minor.

Anthus pratensis (L.)—Meadow Pipit.
1 ♀, Qazvin—1st January.
2 ♂, Resht—January-February.
1 ♂ Menjil- 1st April.

The Meadow Pipit is fairly common in rice fields and pastures round Resht in January and February. The last I saw was on 1st April at Menjil. I also saw the bird once at Qazvin in January.

Anthus cervinus (Pall).—Red-throated Pipit.
1 ♂, Enzeli—27th April.

I saw Red-throated Pipits in full breeding plumage on 27-29th April among flocks of various subspecies of Yellow Wagtails. Very few were seen.

Motacilla flava feldegg, Michahelles (*melanocephala*, Licht).—Black-headed Wagtail.
1 ♂, Enzeli—28th April.
1 ♂, Enzeli—28th June (R. E. C.) (breeding).

The specimens are definitely *M. f. feldegg* and not *M. f. melanogrisea*.

I saw two or three Black-headed Wagtails at Enzeli on 17th March. I never saw them again till 28th April when one male appeared among the thousands of *M. f. campestris*, *beema*, and *thunbergi* which had then been frequenting the

sandhills for a week. Through May I occasionally saw them amongst the other sub-species and at the end of May they were obviously nesting among brambles on the reedy islands of the Enzeli lagoon. Several pairs bred without the least doubt, but I never found the nest. Cheesman shot one of the males on 28th June, the testes were enlarged.

Motacilla flava campastris, Pall.—Yellow Wagtail.
6 ♂, Enzeli—17-27th April.

M. f. beema, Sykes.—Grey-headed Wagtail.
3 ♂. Enzeli—22-24th April.

M. f. thunbergi, Billberg (*viridis*. Gmelin, *borèalis*., Sund).—Sykes' Yellow Wagtail.
5 ♂. Enzeli—24th April.

In the last ten days in April huge mixed flocks of the Yellow-headed, Grey-headed, and Sykes' Yellow Wagtails appeared on the sandhills and grazing grounds round Enzeli. *M. f. campestris* was the commonest, *M. f. beema* and *M. f. thunbergi* both common. About ¾ or ⅘ of the total number of birds were males. These flocks continued to pass through Enzeli throughout May. By 25th May ¾ of the whole were females of various sub-species; among the males *M. f. thunbergi* was commonest, *M. f. beema* common and *M. f. campestris* quite uncommon. A few Yellow Wagtails (*M. flava* sub-sp.) passed through Qazvin 7th September and onwards.

Motacilla cinerea, Leach.—Grey Wagtail.

Grey Wagtails are not rare in winter both in the uplands (Kermanshah November 1918. Qazvin December 1918 common) and in the low country round Resht. They were last seen round Resht in the third week in March. Cheesman saw one male at Gulahek, Tehran on 11th June. No specimens were obtained.

I do not know to which race the specimens seen belonged. Zarudny records the Western *M. cinerea cinerea* (*M. b. boarula*) and *M. c. melanope* (*M. boarula melanope*) from various parts of Persia, the first mentioned as a breeding bird.

Motacilla alba alba, L.—White Wagtail.
1 ♂, Menjil—1st April.
1 ♀, Enzeli—27th April.

M. alba dukhunensis, Sykes.
1 ♀, Qazvin—16th December 1918.
1 ♂, Qazvin—4th January.
2 ♂, Resht, and Enzeli—February March
1 ♀, Qazvin—1st September

M. alba persica, Blanf.
1 ♂, Tehran to Qazvin Road—18th June (R. E. C.).
1 ♂, Qazvin—1st September.

The correct identification of White Wagtails is always a difficult matter. *M. alba alba*, the ordinary "White Wagtail", is probably a migrant on spring and autum passage. *M. a. dukhunensis* was the commonest form, and was seen in winter all the way from the Mesopotamian border through Kermanshah and Hamadan to Qazvin and on to Resht and Enzeli. At the last two localities it was not common in winter, but it became more frequent at the end of February and was seen once or twice a week from then until I left the place in July; family parties were seen on 2nd June, and I think we may be practically certain that this sub-species nested in or near Enzeli and Resht. I was

in Qazvin from the middle of July till the end of October, and never saw *M. a. dukhunensis* until 7th September after which it became fairly common. *M. a. persica* is more easly distinguished in the field than as a skin. My notes state definitely that at Qazvin it was commoner than the other race in mid-winter, but as I have no skin to support this I suppose we cannot regard it as a definite record. It appeared to be easily distinguished in the field by the much greater extent of black on the sides of the neck even in winter. Cheesman's specimen shot on the road between Tehran and Qazvin on 18th June is marked "Iris dark brown, bill and legs black, organs advanced, evidently breeding"; and at Qazvin this form was certainly not uncommon, generally in family parties, from the middle of July until the end of September. My only specimen was shot on 1st September.

Sitta europæa rubiginosa, Tschusi and Zarudny.—Nuthatch.
1 ♂. near Menjil—27th March.

I never saw the Nuthatch in the low forest round Resht Enzeli, but as soon as one mounts the lowest slopes of the hill it becomes quite common, and is often seen up to about 6,000 ft. which is the approximate height of the tree-level. It is found particularly in the mixed forest in which the Persian Oak is the predominant tree. Woosnam's specimens from Mazandaran and Gilan belong to this race. Witherby referred them to *S. e. cæsia* (1910), no doubt because the original description of *rubiginosa* fails to point out the salient features of the race. Buturlin (1916) points out that *S. e. rubiginosa* differs from the other races of the species in not having white spots on the outer tail feathers, in the dark colour of the upper side, and in the very dark chestnut colour of the flanks; he gives other and in my opinion less reliable characters by which this sub-species may be distinguished. The bill of my male measures 18, the wing 80 mm.

Sitta rupicola rupicola, Blanford.—Rock Nuthatch.
1 ♂. Menjil—23rd March.
2 immat. Tehran—14th June.

Sitta neumayer obscura, Zarudny.
1 ♂, 1 ♀. Menjil—12th October.

Sitta n. dresseri, Buturlin (*Sitta syriaca tschitscherini*, Auctt., not Zar.)
1 ♀. Qasr-i-Shirin—22nd May (R. E. C.).

One of the most interesting results of our collecting is the re-discovery of Blanford's *Sitta rupicola*. This is a small species of Rock Nuthatch, and it inhabits the same ground as the larger *S. neumayer* sub-species in at any rate many parts of Persia. In the N. of Persia the small one is represented by the form *S. r. rupicola*, the larger by *S. n. obscura* and these two are mainly distinguishable by size. In S. W. Persia they are replaced by two forms similar to one another but differing entirely from all other Rock Nuthatches in the extremely pale colour, the smaller being *S. r. tschitscherini*, the larger *S. n. dresseri* (wrongly referred to as *tschitscherini* by British authors). Very little is known of the small species and ornithologists in Persia should lose no opportunity of studying this bird and obtaining specimens of it; its nesting habits are, I believe, entirely unknown. Major Cheesman was able to say that there are differences in the notes of the two; we want also to learn whether they are often found on the same piece of ground, as we know is sometimes the case; and what type of ground they affect if it is found that they do not generally live together. I have recently discussed certain technical points about the Rock Nuthatches of Persia (1920 *b*). Cheesman's specimen of *S. n. dresseri* is interesting as it is proof of the occurrence of yet another characteristically S. W. Persian bird in the country between the frontier and Kermanshah.

Parus major major, L.—Great Tit.
(*Parus major caspius*, Zarudny and Loudon).
(*Parus major karelini*, Zarudny).

3 ♂, Resht—February.
1 ♀, Resht—March.
1 sex ? Resht—January.
1 ♂, imm, 1 ♀, Enzeli—June.
1 imm. Enzeli—June (R. E. C.).

The Great Tit is a common resident in the low damp forest round Enzeli and Resht, and also in the dry forest on the N. slopes of the Elburz. Young were flying in the third week of May at Enzeli. This series is entirely indistinguishable except by a slightly less size from long series of *Parus major major* with which I have compared it at Tring Museum and in Mr. Witherby's collection and this conclusion has been independently arrived at by C. B. Ticehurst. The Great Tit of the forest bordering the Caspian was first described by Zarudny and Loudon (1905) as a different sub-species under the name *P. m. caspius* ; none of the points on which they separated it appear to be reliable when a series is examined, and these authors appear to have doubted whether it was really separable at the time when they first described it. Subsequently (1911a) Zarudny replaced the name *caspius* by the name *karelini*, without explaining on what grounds he took this step. The wings of these specimens measure, ♂ 70-74 mm., 1 ♀ 67 mm., measurements which are consistently a few millimetres less than those of Western European birds.

Parus major blanfordi, Prazak.—Persian Great Tit.
(*Parus major zayrossiensis*, Zarudny and Loudon.)

3 ♂, Kermanshah—November and December 1918.
3 ♂, Qazvin—December 1918 and January 1919.
1 ♀, Hamadan—December 1918.
2 ♂, 1 ♀, Tehran—June (R. E. C.).

I found this race of the Great Tit a common bird in gardens and small woods in the plateau in winter, and Cheesman found it common in summer. He shot a female at Tehran "out of a party of flying young: it contained one egg complete so was apparently laying for a second brood" Prazak's type of *P. m. blanfordi* came from Tehran, and I can find no difference between Cheesman's three skins from this place and a series collected by Witherby in S. W. Persia; these last must on geographical grounds be the *P. m. zayrossiensis* of Zarudny and Loudon. Both Witherby's and Cheesman's skins were shot in summer and are so worn that it is not possible to form a definite opinion on them alone; fortunately, however, there are in England at present eight or nine skins from Shush, Shiraz &c., (coll. B. N. H. S.); some of them are winter birds. C. B. Ticehurst has compared them with my series and we agree that *blanfordi*, Prazak,=*zayrossiensis* Zar. and Loud. The wings of my specimens measure, ♂s 72-77 mm., ♀s 72 mm. The conclusion then is that the typical Great Tit of Continental Europe is found in the forests of Gilan, and presumably in the Talish, and in Mazandaran. In the plateau we find a very distinct larger and paler form which we now know extends from Tehran, Qazvin, etc., southwards and westwards to the Zagros country and Fars. All this was quite correctly stated by Witherby in 1910, I cannot agree with Hartert's statement (*Vog. pal. Fauna*, Vol. I, p. xxxii) that *caspius* is a synonym of *blanfordi* the range of which he gives as Tehran, Gilan, Mazandaran, Asterabad and the Talish woodlands.

Parus cæruleus persicus, Blanford.—Persian Blue Tit.

1 ♀, Kermanshah. 30th Nov. 1918.

The very pale Persian Blue Tit was first seen as soon as one reached the scrub oak country round Pa-i-Taq. It was fairly common in the small wood on the outskirts of Kermanshah. This bird is one of the typical birds of the oak woods of the S. W. of Persia, and Pa-i-Taq and Kermanshah are about the northern limit of its range.

Parus cæruleus raddei, Zarudny.—Caspian Blue Tit.

1 ♂. 1 sex ? Resht—January.

This race of the Blue Tit was described by Zarudny (1908) from Mazandaran. Gilan and Asterabad, that is to say, from the great forest which runs all along the S. coast of the Caspian. As he says the Blue Tits of this region are duller in colour, and smaller than the typical race. My two specimens measure, the male, wing 60 mm. tail 48 mm., and the unsexed specimen, wing 60 mm., tail 46 mm.,

Woosnam's specimens from the S. coast of the Caspian agree in these characters. I have not been able to go into the question of the identity of *P. c. raddei* and *P. c. calamensis*. At Resht and Enzeli this Tit is a somewhat scarce resident, scarcer than either the Great Tit or the Longtailed Tit; it occurs also in the higher forest 1,—3,000 ft.

P. c. satunini is described by Zarudny in the same place from "Lenkoran, Qazvin and the Mountains of Transcaspia". There is nothing improbable in the existence of a till-then undescribed form of Blue Tit in "Qazvin and the mountains of Transcaspia", or as one might say, in the semidesert country to the S. and E. of the forests inhabited by *P. c. raddei*: it is in the highest degree unlikely that such a tit would descend from the very dry highlands into the damp forest of Lenkoran, a forest moreover which is continuous with "Mazandaran, Gilan, and Asterabad", the home of *P. c. raddei*. Unfortunately there are no specimens with which to prove or disprove the existence of *Parus cæruleus satunini*, the distribution of which seems so anomalous.

Parus ater gaddi, Zar. and Härms.—Cole Tit.

1 ♀, 1 sex 3 Noglabar—3rd March.

1 sex ? Menjil—27th March.

The Cole Tit of the Caspian Forests has been referred to by Witherby (1910) as *P. a. phœonotus*, Blanford, which was described from oak forests near Shiraz. Whitherby suggested that there had been some error in labelling and that the skins had really come from the Caspian Provinces. This we now know not to have been the case as Zarudny has re-discovered Blanford's race in the Zagros Mountains. He finds this race constantly different from that of the S. Caspian forests which he describes as *P. ph. gaddi*, stating that it differs from *P. ph. phœonotus* in the much browner colour of belly and flanks and much duller back. I have compared Blanford's type of *phœonotus* with eight skins (Woosnam. and Buxton) from the S. coast of the Caspian, and the forests on the N. slopes of the Elburz, and I find that Zarudny was justified in separating *P. a. gaddi* on its less rufous, more olivaceous back. Without a larger series of *P. a. phaeonotus* I am unable to decide whether the flanks and belly are browner in *gaddi* than in this race. I can find no difference in size; the only specimen of *P. a. phœonotus* (♂) in the British museum has a wing of 67 mm; 3 ♂ *gaddi* measure 67-69 mm, 4 ♀ 63.5-66 mm.

The Cole Tit of the Caspian forests is common among beech and oak trees on the slopes of the hills; Ingoldby found it common in such places near Bandar-i-Gez, I myself near Menjil and Noglabar. It is never seen in the damp, low-lying forests round Resht and Enzeli.

Acredula caudata tephronota, (Gunther) (*passekii*, Zarudny).—Long-tailed Tit.

1 ♀. 1 unsexed. Kermanshah—December 1918.

Acredula caudata alpina, (Hablizl.).

1 ♂. 2 ♀, Resht.—January.
1 unsexed. Enzeli—February.
2 imm. Enzeli—30th June (R. E. C.).
1 ♂. Noglabar.—21st March.
1 imm. Tula Rud, Talish—8th July.

I first saw Long-tailed Tits at Kermanshah, where they were common in the little oak wood on the edge of the town among parties of other species of Tit. The birds from Kermanshah are separable from Long-tailed Tits from Gilan by the much paler colour of their upper sides. On the other hand they are not separable from specimens from W. Turkey in Asia, and must therefore be called *A. c. tephronota*, Gunther (1865), (Terra typica, Asiatic side of Bosphorus). *Passekii* of Zarudny described in 1904 from S. W. Persia is a synonym.

I saw no Long-tailed Tits between Kermanshah and the great Caspian forests, and this agrees with Zarudny. The moment one enters the forest which borders the Caspian Sea, Long-tailed Tits are found; they are common both in the dry oak woods on hillsides at Menjil and Noglabar and also in the very wet low-lying mixed forest round Resht and Enzeli. I found a nest ready for eggs on 19th February at Resht, but never saw fledged young till the end of May when they became common at Enzeli, etc.

This race, which inhabits Gilan and Mazandaran and the Talish is much darker on the upper surface than *A. c. tephronota*. It must be called *A. c. alpina* Hablizl (Pallas, Neue Nord. Beytrag IV, p. 49, 1783, from Gilan). I am indebted to Mr. H. F. Witherby for pointing out the identity of the Long-tailed Tit of W. and S. W. Persia with that of Asia Minor, and its distinctness from the form which appears to be confined to the great forest which fringes the S. W. and S. shores of the Caspian. The juvenile plumage of *A. c. alpina* is undescribed, and Mr. Witherby has been good enough to draw up this description of it from our specimens. "Brown like juveniles of *A. c. caudatus* on upper parts, but not quite so dark, and centre of crown not white, but with only a few narrow white edgings to the feathers of centre of hinder part of crown; chin and throat pinkish-buff, not so pink as in *glaucogularis* and not extending down breast; throat with no black patch as in adult; upper breast with brown streaks much as adult, rest of under-parts whiter than in adult, and with no pink. Decidedly darker than *A. c. tephronota* in same plumage."

Anthoscopus pendulinus persimilis, Hartert.

1 ♂, 1 ♀, Khurramdurrah—23rd June (R. E. C.).

Cheesman's skins appear to belong to this race, which is known (Hartert 1918) from Eregli in the Cilician Taurus, Lenkoran on the west coast of the Caspian and L. Urumiyeh. No doubt the *Anthoscopus pendulinus* which Zarudny records as breeding in N. W. Persia belonged to this form. The wing of the above male measures 53·5 mm, of the female 52 mm. Cheesman says "feeding in popular trees, organs small. Another pair was seen with flying young. Continually utters a shrill plaintive whine like a Reed Bunting. Sways from side to side meanwhile. Iris dark brown, bill brown, feet plumbeous." I saw a nest of some race of the Penduline Tit at Kermanshah in December 1918, hanging from the tip of a willow twig.

Lanius collurio, L.—Red-backed Shrike.

Red-backed Shrikes arrived at Enzeli in small numbers on 30th April and remained through the summer. I found a nest with newly hatched young at Tula Rud, Persian Talish in a bush on the shore of the Caspian on July 4th.

No specimens were obtained. This is regrettable; they would probably represent the little known *Lanius collurio kobylini* of Buturlin (*fuscatus*, Zar. non Lesson).

Lanius senator, L.

„ Nest and fresh eggs, 24th May 1919, Taq-i-Girreh. Nest like that of *collurio*, in small oak, neater than usual shrikes, built of wool and hair with stalks of calvary clover with seed heads on it. Inside lined with white woolly flowers of a plant like eidelwies, and spiders webs. One piece of newspaper and dead leaf" (R. E. C.).

Lanius minor, Gm.—Lesser Grey Shrike.

1 ♂. Gulahek, Tehran—11th June (R. E. C.).

"Paired, testes plus." It is curious that I never saw that most conspicuous bird the Lesser Grey Shrike at Qazvin, though I was there from 17th July until the end of the summer. I am almost convinced that a number of the birds which breed in Qazvin, and no doubt in other places in the northern part of the plateau move away from their breeding places by the middle of July, just when everything becomes hot and dry and dusty.

Muscicapa parva parva, Bechst.—Red-breasted Flycatcher.

1 ♂. Enzeli—April.

The above was the only specimen I saw of the Red-breasted Flycatcher. It was shot in a dense wood close to Enzeli.

Muscicapa hypoleuca semitorquata, Hom. (*M. atricapilla semitoquata*).—Pied Flycatcher.

2 ♂, 2 ♀, Tehran—6th-10th June (R. E. C.). "Organs very small."

This race of the Pied Flycatcher "Seems to catch most insects on the ground, and occasionally on the branch of a tree—not seen catching them on the wing" (R. E. C.).

Phylloscopus collybita abietina (Nilss.).—Scandinavian Chiffchaff.

2 ♂, 1 ♀, Resht—February-March.

The Scandinavian race of the Chiffchaff was the only one of which skins were preserved. It was common through the winter at Resht and Enzeli. The wings of the males measure 65, 66 mm, of the female 57 mm.

I heard the note of some race of the Chiffchaff at Enzeli from 15th March to the third week in April. Zarudny records the Common Chiffchaff *P. c. collybita*) as "breeding (?)" in the Caspian region of Persia.

Lusciniola melanopogon mimica, Mad.—Eastern Moustached Sedge Warbler.

1 ♂. Resht—January.

1 sex ? Enzeli—March.

This Eastern race of the Moustached Sedge Warbler was locally common in winter in reed beads at Enzeli and Resht and I saw it until the third week in March. A very minor, but inconvenient "war" prevented my seeing the bird after that. Zarudny records it as breeding in the region south of the Caspian.

Cettia cetti orientalis, Tristram.—Cetti's Warbler.

1 ♂. Kermanshah—30th November 1918.

1 ♂. Enzeli—6th February.

1 ♀. Kermanshah—27th May (R. E. C.).

1 ♂. Khurramdarrah—23rd June (R. E. C.).

Apart from the above records Cheesman found Cetti's Warbler quite generally distributed in all the places he visited in the plateau in May and June. At Kermanshah he found a nest on 27th May "in a thick rose bush one foot from ground on a bank; neat and strong, made of grasses lined with hair. It contained unfledged young and one unhatched egg of a uniform anchovy sauce colour." At Tehran he saw Cetti's Warbler as high as 6,000 feet.

Specimens of Cetti's Warbler from Persia, Mesopotamia and Palestine agree in colour with the pale eastern race *Cettia cetti cettioides*, Hume, but in size they are small, like the western *C. c. cetti*. It seems best to admit the validity of Tristram's name *orientalis* even though, as Dr. Hartert informs me, the name

was subsequently quoted by Tristram himself as a synonym of *C. cetti*. The type of *Cettia orientalis* is an adult male shot on Lake Huleh, Palestine, on 14th May 1864. Dr. Hartert has seen this type and informs me that it is of the size of *C. c. cetti*. I have seen in all the following specimens of this race :—from the Caspian Provinces of Persia five males wings 65, 66, 66, 66·5, 69 mm.; from East Persia, a male 64, female 68 mm ; from Fars in S. W. Persia a male 65, female 59 mm ; from Kermanshah males 64 and 67, female 60 mm ; from Amara in Mesopotamia a male 64 mm ; from Palestine one female 54 mm. All these specimens are pale like *C. c. cettioides*, the wing measurement of which is ♂ 70-72.5, ♀ 64-65 (Hartert.).

Acrocephalus arundinaceus zarudnyi, Hartert.—Great Reed Warbler.

1 ♀. Enzeli—10th June.
1 ♂. Enzeli—25th June.

This race of the Great Reed Warbler was first seen during the last three days of May. It rapidly became common in all the reed beds round Enzeli. A bird was seen on 10th June carrying something in its mouth, presumably nesting material. The bird remained common through the summer.

These specimens have been compared with the type of *A. a. zarudnyi* at Tring. It will be observed that I find myself once again in disagreement with Zarudny who records the typical race of this species from N. W. Persia and the Caspian and *A. a. zarudnyi* only from various parts of Eastern Persia.

Acrocephalus scirpaceus macronyx (Severtzov.).

2 ♂, 2 ♀, Enzeli—10th-28th June (P. A. B. and R. E. C.).

This race of the Reed Warbler was found by Cheesman and myself obviously breeding in bramble bushes growing on dry land on islands in the Enzeli lagoon ; we failed to find nests, but observed one pair feeding fledged young. The birds were exceedingly local and were practically confined to the bushes, though once or twice I saw, but did not obtain, small *Acrocephali* in the reed-beds, and I believe that these birds were of the same species. Cheesman made a note that the song and behaviour resembled that of the Olivaceous Warbler (*Hypolais pallida*). Dr. Hartert has seen the skins and there is no doubt of the correctness of the identification though they were found nesting so far from a reed-bed.

Hypolais pallida elaeica (Lindermayer.).—Olivaceous Warbler.

1 ♂, Enzeli—May.
1 ♂, 1 ♀, Astara—July.
2 ♂. Tehran—June (R. E. C.).

I have no note of the arrival of the Olivaceous Warbler at Enzeli. It bred commonly in the bramble bushes on the islands in the Enzeli lagoon ; at Astara, on the Persian side of the frontier between Persia and Azerbaijan I saw family parties in gardens on 3rd July. At Tehran Cheesman found three nests in rose bushes in gardens on 6th June.

Sylvia mystacea, Ménétr.—Ménétries' Warbler.

Ménétries' Warbler arrived at Enzeli in the second week in April, the males before the females, and bred in bramble bushes among the sand dunes along the shore. I obtained no specimens, but can vouch for this record of a species with which I became very familiar in Mesopotamia. I never saw it at Qazvin in July-October 1919. Ménétries' Warbler has already been obtained by Woosnam on the S. coast of the Caspian (Witherby 1910).

Sylvia curruca curruca (L.)—Lesser Whitethroat.

1 ♀. Enzeli—25th April.

The Lesser Whitethroat suddenly became common at Enzeli on 25th April. There is no question of the identity of this specimen ; the wing measures 66 mm. and the second primary is intermediate in length between the fifth and sixth,

Sylvia communis icterops, Ménétr.—Eastern Whitethroat.

1 sex ? Qazvin—14th September.

The above is my only definite record of the Eastern race of the Common Whitethroat.

Agrobates galactotes familliaris (Ménétr.)

1 ♂. Qazvin—20th June (R. E. C.).

"Several pairs evidently breeding at Qazvin, organs advanced, not noticed at Tehran" (R. E. C.). I was in Qazvin from 17th July till October and never saw the bird at all though I looked for it carefully; probably it migrates as soon as the young are fledged.

Zarudny (in collaboration with Härms) described *A. f. persica* from "Mesopotamia, Zagros and Baluchistan."; no doubt he refers to *Persian* Mesopotamia and *Persian* Baluchistan. I can find no difference between specimens from Transcaspia, N. W. Persia, the Bampur River in Persian Baluchistan, and Baghdad and Amara in true Mesopotamia. It appears to me that the points on which *A. f. persica* was separated were due to individual variation.

Turdus merula syriacus, Hempr and Ehr.—Persian Blackbird.

1 ♂, 1 ♀. Kermanshah—November and December 1918.

1 ♀, Tehran—June (R. E. C.).

Imm. Tehran—June (R. E. C.).

This sub-species of the Blackbird was common at Kermanshah in December. In June Cheesman found it common up to 8,000 ft. in the hills above Tehran. Birds were feeding fledged young on 6th June, but on 12th June he shot at Gulahek, in the garden of the British Legation, a female which contained "organs very advanced, would have laid in three days. Iris brown, bill dark orange, upper mandible brown towards base. Hen is difficult to distinguish from cock unless handled, owing to dark colour and yellow bill." One might add that the difficulty is due not only to the dark colour of the female, but also to the fact that the male is dark slate grey, not black.

The immature in *first plumage* (sex unrecorded, Tehran, 12th June 1919) had "iris brown, bill brown, legs dark olive brown". It differs from *T. m. merula* (Great Britain) in the same stage of plumage by its much duller and less red colours. The upper side of *T. m. syriacus* is dark olivaceous brown and the streaks on the centre of the body feathers are less developed than in the typical sub-species and entirely without any redbrown tint. The throat and breast lack the redbrown colour of *T. m. merula*, the abdomen and under tail coverts are very dark and very grey. The measurements of the specimens are; ♂ exposed culmen 23 mm., wing 130 mm., tail 105 mm; ♀ (Kermanshah) culmen 20 mm., wing 128 mm., tail 111 mm.; ♀ (Tehran, R. E. C.) culmen 21 mm., wing 128 mm., tail 109 mm.

Turdus merula aterrimus (Mad.)—Caspian Blackbird.

1 ♂ Resht—January—culmen 21, wing 127, tail 98 mm.

1 ♀ Resht—January—culmen 22, wing 124, tail 96 mm.

1 ♂ Enzeli—February—culmen 22·5, wing 130, tail 105 mm.

1 ♀ Menjil—March—culmen 22·5, wing 128, tail 96 mm.

This race of Blackbird is found in the forest on the south shore of the Caspian. It was common in January and February at Resht and appeared to become still commoner at Resht and Noglabar and in the woods above Menjil in March. After that it was much rarer though small numbers remained and no doubt bred, round Resht and Enzeli. The measurements of culmen refer to the exposed portion only.

Turdus musicus, L. (*T. iliacus*, Auctt.)—Redwing.

2 ♂, Resht—February.

The Redwing is common round Resht and Enzeli in winter, and was last seen in the third week in March.

Turdus pilaris, L.—Field Fare.

The Field Fare was common in the forest near Resht in winter and just as difficult to approach as it is in England. The last I saw were in juniper bushes at 8,000 ft. on the hills above Menjil on 27th March.

Turdus philomelos philomelos, Brehm.—Song Thrush.
(*Turdus musicus*, Auctt.)

1 ♀, Kermanshah—November 1918.
2 ♂, Resht—January and February.

The Song Thrush is common in the low-lying forests of Gilan in winter. A small number remained all the summer, though their number might easily have been overlooked in the dense jungle after the leaves were on the trees. The Song Thrush was also seen at Kermanshah and Hamadan in December 1918, and once only at wind-swept Qazvin in January.

The three specimens appear to differ in no respect from the Continental Song Thrush.

Monticola solitarius transcaspicus, Hartert.—Blue Rock-Thrush.
(*M. cyanus*, Auctt.)

1 ♂, Qasr-i-Shirin—24th November 1918.

The specimen has been compared with the type at Tring and undoubtedly belongs to this well-marked race. The Blue Rock Thrush was common among the crags at Menjil, I think at every season of the year.

Œnanthe œnanthe œnanthe (L)—Common Wheatear.

1 ♂, Menjil—26th March.
1 ♀, Enzeli—30th April (ovary not enlarged).

The Common Wheatear passed through Enzeli from the last week of March till the first of May, and was abundant, April 20-30. The specimens belong to the typical race (wing of male 97 mm., of female 98 mm).

Œnanthe hispanica melanoleuca (Güld) (*xanthomelœna*, Hempr. and Ehr.)—Eastern Black-eared Wheatear.

1 ♂, Pa-i-Taq—May (R. E. C.).

"Roof of mouth and gape black. Organs advanced, evidently breeding." This specimen appears to agree in every particular with the eastern race of the Black-eared Wheatear. The chin and throat are white, the wing measures 87 mm. It is interesting to find this race so close to "Arabistan and Luristan" from which Zarudny and Loudon (1904) described *Saxicola gaddi*.

Œnanthe finschii barnesi (Oates).
(*Saxicola melanoleuca melanoleuca* (Güld).

1 ♂, 1 ♀, Qasr-i-Shirin—November 1918.
1 ♂, Pa-i-Taq—24th May (R. E. C.).

I found this Wheatear common at Qasr-i-Shirin and Cheesman's record for Pa-i-Taq ("organs advanced, evidently breeding") is only a short distance further N. E. We know then that it is resident in this low rocky country. I saw it again at Menjil in March, also in rocky country at about 2,000 ft. We never saw it in the higher ground between Menjil and Pa-i-Taq. "Roof of mouth and gape orange yellow" (R. E. C.).

Œnanthe isabellina (Cretzschm)—Isabelline Wheatear,

1 ♂, Enzeli—17th March.
1 ♂, Nahvand—June (R. E. C.).

The Isabelline Wheatear is common round Menjil in spring and summer. It is quite rare in the plateau round Kazvin in summer, and was not seen there in winter. The specimen shot at Enzeli was perching in a tree in a flooded wood, a most unsuitable place for this desert bird even on migration. Cheesman noticed them near Qazvin on 23rd June "feeding flying young on black ants."

Œnanthe pleschanka pleschanka (Lepech)—Siberian Wheatear.

2 ♂, 1 ♀, Tehran—13-14th June, (R. E. C.).

"Gape black: with flying young, feeding done entirely by ♀ during ½ hour I was watching" (R. E. C.).

Œnanthe xanthoprymna chrysopygia (De Fil)—Red-tailed Wheatear.

2 ♂, 1 sex? near Qazvin—25, 26th September.

2 ♀ (one cream-coloured) near Tehran—13-16th June (R. E. C.).

2 ♂ (1st plumage) near Tehran—13th June (R. E. C.).

The Red-tailed Wheatear was common on the high-road between Menjil and Qazvin at the end of September at about 4,000 ft. It had then moved down from its breeding grounds, as in July it is never seen on that stretch of road; nor is it found there in winter, Cheesman found this bird in the hills behind Tehran on 14th June at from 5,500 to 12,000 feet, accompanied by fledged young. He noticed that it frequently dives under the shadow of a large rock and then allows one to approach closely to it.

Saxicola rubetra noskœ (Tschusi)—Whinchat.

1 ♂, Enzeli—1st May.

The Whinchat was common at Enzeli in the last week of April and early May. The single specimen preserved belongs to the race *P. r. noskœ*, described by Tschusi from North Caucasia. The species did not remain to breed at Enzeli.

Phœnicurus phœnicurus phœnicurus (L)—Common Redstart.

The Common Redstart arrived in numbers at Enzeli on 30th April. I have no note of the date on which I last saw it in the spring, but it did not remain to breed.

Phœnicurus ochrurus ochrurus (Gmel.).

1 ♂, 1 ♀, Qasr-i-Shirin—24th November 1918.

These specimens were the only ones I saw of this Redstart.

Phœnicurus erythronota (Eversm.)—Eversman's Redstart.

1 ♂, 1 ♀, Asadabad—December 1918.

1 ♂, Hamadan—December 1918.

Eversman's Redstart is common in orchards in mid-winter, at Asadabad, Hamadan and Qazvin. No weather appears too severe for it, and it occurs at any rate up to 8,000 ft. at Christmas time.

Luscinia megarhyncha africana (Fisch. and Rchw.)—Nightingale.

1 ♂, 1 imm., Tehran—June (R. E. C.).

3 ♂, Enzeli—June (R. E. C. and P. A. B.).

Nightingales arrived and began to sing at Enzeli in the last few days of April. They were exceedingly local, but six or eight pairs bred undoubtedly in one swampy bramble and alder thicket of about three acres, and few others for miles around in very similar country. Cheesman found several pairs breeding at Gulahek and at Tehran, on 6-8th June he found eggs, unfledged and flying young. On 12th June at the Legation, Tehran three fresh eggs were found in a nest which was unfinished six days before. He heard Nightingales up to 8,000 ft. in the mountains just behind Tehran.

Erithacus rubecula hyrcanus, Blanf—North Persian Robin.

1 ♂, 1 ♀, Resht—21-28th January.

1 ♂, Noglabar—21st March (1,000 ft.).

Erithacus rubecula caucasicus, Buturlin—Caucasian Robin.

2 ♀, Resht—15th February, 8th March.

The North Persian Robin (*E. r. hyrcanus*) and that from Caucasia (*E. r. caucasicus*) winter together in the forests round Resht and Enzeli. They are common, but difficult to detect in the dense jungle. About the end of March, Robins become

rarer, because *E. r. caucasicus* goes away to Caucasia to breed. *E. r. hyrcanus* remains and no doubt breeds in the forest, but becomes even more retiring. The specimen shot on 21st March had greatly enlarged testes. I saw, but did not obtain Robins at Kermanshah in November and December 1918. Both sub-species are found on the River Tigris at Amara in winter.

Prunella modularis orientalis (Sharpe)—Caspian Hedge-Sparrow.
2 ♀, Resht—February.

I have compared my Hedge-Sparrows with a long series of the typical form and with two specimens labelled "*orientalis*" at Tring (from the Talish), and with Woosnam's single specimens from the "S. coast of the Caspian" (recorded by Witherby (1910) as *Accentor modularis blanfordi*). Sharpe originally described *orientalis* from Batum, and until a series is forthcoming from that place one cannot be certain that these birds are Sharpe's race; but at any rate the Resht, Talish, and "S. Coast of Caspian" specimens agree with one another, and differ from *P. m. modularis* in being less rufous above and more brownish (less gray) on the sides of the neck and on the throat. Provisionally I refer them to *orientalis*, Sharpe.

Of the status of Zarudny's *Accentor modularis blanfordi* (1904), to which Woosnam's specimen was referred by Witherby, we know nothing beyond Zarudny's description according to which it is quite a distinct race with unicolorous crown, &c. It was described from oakwoods S. and S. W. of Ispahan, and it does not seem probable that Woosnam's specimens would be referable to it.

Troglodytes troglodytes hyrcanus, Zar. and Loudon (?)—Wren.
1 ♂, Kermanshah—December 1918.
1 ♂, 1 ♀, Resht, January—February.

Wrens were not uncommon at Kermanshah, Asadabad, and other places in the plateau in winter in brambles, &c., in the gardens, but they were of course exceedingly difficult to shoot. They were common at Resht and Enzeli in winter and probably in summer also, though it became impossible to see them after the leaves came out. I find it impossible to identify these three skins satisfactorily: they are very grey in general colour and this is most noticeable in the under tail coverts, and I cannot distinguish them from series of Wrens from the Terek, Vladikavkaz, and other places in Ciscaucasia. They are probably the form *hyrcanus*, Zar and Loudon; on the other hand it is not unlikely that Wrens from Kermanshah, &c., would be *T. t. zagrossiensis*, Zar and Loud. (1908). Members of the Society in Persia are strongly urged to collect series of Wrens from any part of the country in which they occur: two or three forms have been described by Russian ornithologists, but we have no skins and no knowledge of these forms at all.

Hirundo rustica, subsp.—Swallow.
1 ♀, Tehran—13th June (R. E. C.).

The Swallow arrived at Enzeli on 28th February, remained through the summer and bred commonly. I find it impossible to identify this single specimen. The underside is more suffused with reddish brown than is at all usual in *C. r. rustica* L., but is not so dark red-brown as it is in *C.r. transitiva*, Hartert, which is resident in Palestine, and in turn leads on to *C. r. savignii*, Steph with a deep red-brown breast. Specimens similar to mine, and more or less intermediate between *H. r. rustica* and *H. r. transitiva* are, I believe, not unusual in Egypt, Palestine, &c.

Hirundo daurica rufula, Temm.—Red-rumped Swallow.

The Red-rumped Swallow was seen by Cheesman at Karind in May, where a pair were hawking flies in a rocky gorge. There was no evidence that they were breeding. This appears to be its most northerly occurrence in Persia.

Riparia riparia (L)—Sand Martin.

The Sand Martin appeared at Enzeli on 3rd May; on 28th May Cheesman saw a large colony breeding near Kangavar. No specimens were obtained by either of us, though the birds presumably belong to the typical race of the species.

Riparia rupestris, Scop.—Crag Martin.

1 ♂, near Menjil—15th July.

Crag Martins are common all along the road 20-30 miles south of Menjil wherever there are cliffs. The birds are not there in winter; I do not know the actual date of their arrival, but I first saw them on 27th March, and they bred commonly. I have seen the nest, but never been able to reach it.

Coracias garrulus, L.—European Roller.

Rollers arrived 14th April at Enzeli. By the 24th they were paired and common. They bred commonly at Resht and Enzeli, several pairs in the ruined look-out in the middle of Enzeli town. Cheesman saw them breeding in trees at Gulahak, 11th June.

All my specimens have miscarried; Zarudny records *C. g. garrulus* on migration through the Caspian Province, N. W. Persia, &c., but has no breeding records for it; he records *C. g. semenowi* breeding in N. W. Persia and the Caspian provinces and many other parts of the country.

Micropus (*Cypselus*) *apus pekinensis* (Swinhoe)—Swift.

1 ♂, Hassanabad, 29th May (R. E. C.).

1 ♀, Qazvin, 20th June (R. E. C.).

Cheesman noticed this bird at Hassanabad, "very plentiful, breeding in crevices of mud-walled houses in all villages". The two specimens belong undoubtedly to *C. a. pekinensis* and not to *C. a. marwitzi*, Rehw, which is the form one might on geographical ground have expected to find.

Merops apiaster, L.—Common Bee-Eater.

The Common Bee-Eater arrived at Resht in the third week of April, and was seen at Enzeli on 30th April. It remained fairly common throughout the summer, and I also saw it at Astara, Menjil, Qazvin, and Cheesman saw it frequenting its nesting burrows at Kermanshah on 26th May. This species was common at Tehran as late as 12th October.

Upupa epops epops, L—European Hoopoe.

2 ♂, Enzeli—14th March—27th April.

A single Hoopoe appeared on 14th March at Enzeli, but I saw no other until 16th April after which they were seen rather infrequently through the summer. On 3rd July I saw a pair feeding fledged young in a hole in a willow tree at Astara. Hoopoes were nesting commonly in bridges near Hamadan, and noticed carrying food as early as 30th May (R. E. C.), and family parties were common at Qazvin at the end of July. In June a pair had a nest in a hole in a chimney at the British Legation, Tehran, and another pair in a tree at Gulhak had nearly fledged young" (R. E. C.).

Alcedo atthis pallasii, Rchb.—Common Kingfisher.
(*A. ispida pallasii.*)

1 ♂, 2 ♀, Enzeli—February—March.

1 ♂ (1st plumage), Astara—4th July.

1 sex ? Bandar-i-Gez—12th January (C. M. I.).

I saw the common Kingfisher at Kermanshah in November 1918, but the only specimen obtained was eaten by a cat. It is a common resident on the Enzeli lagoon, and the streams which run into it and was also common at Astara in July. The measurements of the specimens from Enzeli are as follows:—Male, wing 73, culmen 39; females, wing 74 and 73, culmen 37 and 34 mm.

Halcyon smyrnensis, L.—White-breasted Kingfisher.

I saw several of this most beautiful Kingfisher at Kermanshah at the end of November and the beginning of December 1918.

Picus viridis karelini, Brandt. (?)—Green Woodpecker.

1 ♀, Noglabar—4th March.
1 ♂, Bandar-i-Gez—13th December 1918 (C. M. I.).

The Green Woodpecker is another of the birds which are common on the northern slopes of the Elburz, in the drier forest, but which do not occur in the wet forest which surrounds Resht. This species is found commonly up to the tree-line, at about 6,000 feet. The wings of the two specimens brought home measure 158 mm., in each case: whether the Green Woodpecker of the forest of Gilan and Mazandaran is a separable race I am unable to say. At any rate it is so close to other subspecies that a couple of skins are insufficient to settle the question.

Dryobates syriacus syriacus (Hempr. and Ehren.).—Syrian Pied Woodpecker.

1 ♀, Kermanshah—November 1918.
1 ♂, 1 ♀, Hamadan—December 1918.
1 ♂, 1 ♀, Tehran—June (R. E. C.).

The Syrian Pied Woodpecker is common in winter in the plateau all the way from Karind to Qazvin. Cheesman found a nest in a pollard willow in the city of Hamadan on 30th May, but the pair he shot at Gulahek, Tehran, on 11th June were drilling a nesting hole, also in a willow tree. This bird is always extremely wary and difficult to obtain, but is quite one of the regular garden birds of the country, and one constantly sees it in the Legation garden in Tehran. I have compared this series with skins from Syria and Asia Minor. The development of white banding in the outer two pairs of tail feathers is a very variable character, apparently of no sub-specific significance.

Dryobates major poelzami (Bogd.).—Great Spotted Woodpecker.

1 ♂, 1 ♀ Resht—January and February.
1 ♀, Noglabar—March.
2 imm. ♂, Tula Rud, Talish—July.

The differences between this race of the Great Spotted Woodpecker and the race with which I have just dealt are so apparent in the field that these birds furnish the clearest example of the difference between the avifauna on the plateau and the forest. The present race is absolutely characteristic of the forest, and occurs as far south as Noglabar, which is close to the edge of the forest: from there northwards to the Caspian it is a common bird and one which is found equally in the dry and wet localities.

It appears that the first plumage is unknown, and I have obtained this description of it from Mr. Witherby; it is taken from the specimens from Tula Rud. "Differs from the adult as in other *D. major* by the crown being crimson, each feather having a crimson tip; the vent is dull crimson and the belly has a very faint tinge of crimson or yellow: the black stripe from the base of the lower mandible is almost as strongly marked as in the adult, and is continued as in the adult; most of the ear-coverts in one specimen are sooty black, and in the other the centre of the ear-coverts is the same."

Iynx torquilla torquilla, L.—The Wryneck.

2 ♂, Qazvin—4th September.

The Wryneck passed through Qazvin in considerable numbers during the first ten days of September and was for a short time one of the commonest birds in the gardens.

Cuculus canorus, L.—The Cuckoo.

Cheesman heard the Cuckoo at Kermanshah and saw two at Qazvin, 20th June, and I saw several young birds, presumably on passage in the stony country round Menjil, 12th October. It is very much to be desired that some one will preserve a series of cuckoos from Persia.

Bubo bubo nikolskii, Zarudny.—Eagle Owl.

2 ♂, Kermanshah—November—December 1918.

I saw and shot two Eagle-Owls in the little wood on the outskirts of the town of Kermanshah; they were sitting most conspicuously on the branches of leafless trees, and I killed them without difficulty with a collecting gun. The wings measure 403 and 410 mm., and Dr. Hartert who has seen the skins is of the opinion that they probably belong to the race named *nikolskii* by Zarudny (1905); there is no material of this race available for comparison. I have compared the specimens with upwards of two dozen *B. b. turcomanus*: apart from their smaller size, the under surface is darker and more heavily streaked than that of the darkest *turcomanus*, and the upper side is as dark as that of an unusually dark specimen of that race.

Otus scops pulchellus (Pall.) (?)—Scops Owl.

2 ♂, 1 ♀, Tehran—June (R. E. C.).

"8th June. Gulahek, Tehran. Three eggs in a deserted Magpie's nest, 12 feet from ground in thick woodland: eggs equally incubated. No addition had been made to the Magpie's nest. At least twelve birds calling all night in the legation gardens at Gulahek" (R. E. C.). Series of Scop's owl from various parts of Persia are a desideratum; the validity of Pallas' race *pulchellus* to which I have referred these specimens, is very questionable. The males' wings measure 148, 151 mm., the female's 155 mm.

Strix (*Syrnium*) *aluco*, sub-sp.—Tawny Owl.

The Tawny Owl breeds in the compound of the Imperial Bank of Persia at Resht. It is particularly to be regretted that I obtained no specimens, but so far as we know the Tawny Owl of the Caspian Provinces is identical with that of Western Europe.

Athene noctua, sub-sp.—Little Owl.

1 ♂, Qazvin—24th September.

The Little Owl is not rare in the plateau and is resident even in the bleakest places, and at least as high as 8,000 feet. The only specimen obtained (wing 169 mm.) is nearer to *A. n. bactriana*, Hutton, than to any other named form, but is much greyer than any specimen of that race at Tring or the British Museum, and this is true even when it is compared with other freshly moulted birds. In all particulars it is extremely like two specimens in the British Museum, one from the Taurus and the other from the Tamanlar Dagh.

Falco subbuteo subbuteo, L.—The Hobby.

1 ♀, Enzeli—28th June.

1 imm., Qazvin—18th September.

I have no note of the date on which the Hobby arrived in Gilan, but it was quite common during the summer at Astara, Enzeli, Qazvin and Tehran; I have definite breeding records from all these places, and we found a nest on 28th June at Enzeli at the top of an alder tree in an old Magpie's nest this nest contained two fresh eggs, and the female which Cheesman shot from this nest laid a third egg as she died.

Falco tinnunculus, L.—Common Kestrel.

Cheesman found a nest of the Common Kestrel at Gulahek near Tehran on 11th June; it contained young birds. He definitely identified the parents.

Aquila chrysaëtus, L.—Golden Eagle.

I saw a Golden Eagle twice at very close range at Qazvin in December 1918.

Circus æruginosus (L.)—Marsh Harrier.

The Marsh Harrier is a common resident in the lagoon between Resht and Enzeli.

Milvus milvus (L.).—Common Kite.

(*Milvus regalis*, Auctt.)

Ingoldby and myself put what we believed to be a Common Kite off a nest in a tall alder at Enzeli on 16th April, but we failed to obtain the bird. Cheesman also believes that he saw the bird on the highroad S. of Resht. Zarudny records it as breeding in the region S. of the Caspian.

Milvus migrans (Bodd).—Black Kite.

The Black Kite was common on the outskirts of all the towns and villages from Karind to Enzeli during the winter, and was particularly common at Qazvin. In May Cheesman noticed it from Karind to Kermanshah, but saw no nests between Hassanabad and Hamadan ; he found a nest in the first fork of a tall poplar on 30th May. The species breeds commonly round Resht and Enzeli, and on 16th April I shot a male bird from a nest in the top of a tall alder tree growing in a swamp at Enzeli ; the nest contained three unusually heavily marked eggs.

The status of the form described by Buturlin as *M. m. rufiventer*, from Transcaucasia and Transcaspia is very doubtful. If it is separable the Black Kite of Gilan and Mazanderan probably belongs to this race. Unfortunately my specimens have failed to reach home.

Haliaëtus albicilla (L.)—Sea Eagle.

The Sea Eagle is common all the year round at Enzeli, and one constantly sees the bird sitting on the sand dunes, and the muddy edges of the lagoon, or perched on telegraph poles. They are of course not common except close to the sea or the lagoon but I have seen single birds along the bed of the Sufed Rud as far S. as Noglabar. During the spring I had under observation a nest in a willow close to Enzeli. A pair of Sea Eagles were constantly seen perched in the tree from the end of January onwards, in fact they may be there all the year round, for I only reached Enzeli in January. From mid March they were generally standing, both of them on the nest, and they carried sticks to it. On 10th April I climbed to the nest, a huge mass of sticks five feet across, placed among the all too slender branches of the willow ; it contained no eggs or young, but was draped around the edge with green weeds, and there was a heap of the same weed on the middle of the top of the nest. This decoration was no doubt the work of a Black Kite which shortly afterwards laid eggs on the eagle's nest and reared her young. It is extraordinary that the Sea Eagles tolerated this, as they had certainly repaired the nest, but they continued to hang about the tree all through the summer, roosting close to the brooding Kite by night and perching in the willow tree by day. The Black Kites never appeared to resent the presence of the Eagles, but then no Kite has a conscience. Sea Eagles breed commonly along the coast from Enzeli to Astara.

Pernis apivorus apivorus (L.)—Honey Buzzard.

1 ♀, near Qazvin—26th September.

This specimen is my only definite record of the Honey Buzzard. The wing only measures 405 mm.

Pandion haliaëtus haliaëtus, L.—Osprey.

Ospreys suddenly became very numerous on 15th March at Enzeli, and remained common through the summer, breeding in the forest, nearly always in dead trees. They fished more often in the lagoon than in the Caspian itself and were often seen taking fish out of the stake nets. I have no note of their disappearance in autumn, but they are entirely absent in winter.

Gypaetus barbatus (L.).—Lämmergeier.

Lämmergeiers or Bearded Vultures were quite common at Kermanshah in November and December 1918 and at Asadabad in December 1918 and I also saw them at Menjil in March and April, but I never obtained a specimen.

Gyps fulvus (Hablizl.)—Griffon Vulture.

The Griffon was seen commonly all along the road from Qasr-i-Shirin to Menjil. As is of course natural it is sometimes not seen for many miles where a good road runs across level desert, but it is always quite common on passes and other places where the badness of the road kills the overburdened camel or mule. The Griffon was never seen in the forest country.

Neophron percnopterus (L.)—Egyptian Vulture.

The Egyptian Vulture is not so common as the Griffon, but was occasionally seen wherever there was food for it, for instance at Qazvin, and Menjil. I did not see the bird at Qazvin in mid-winter though I lived there for a month, and it is probable that it is a partial migrant from the colder and more wind-swept parts of the plateau during the winter.

Ciconia ciconia (L) (*C. alba.*)—White Stork.

Cheesman found White Storks breeding at Kangavar, and at Karind he observed "a colony nesting on cliffs high above the village". I can find no other record of the breeding of the White Stork on cliffs, and this is a most interesting record.

Ciconia nigra (L.)—Black Stork.

I saw several Black Storks at Astara in early July; they frequented both banks of the Astara river, which here forms the northern boundary of Persia. I never saw the species elsewhere.

Plegadis falcinellus (L.)—The Glossy Ibis.

I saw one only, on 26th May at Enzeli.

Ardea cinerea, L.—Common Heron.

1 ♂, Enzeli—10th June (wing 470, culmen 133 mm.).

I saw Common Herons fishing in the Kara Su marshes near Kermanshah on 29th November 1918, but I do not know whether the species breeds anywhere in the neighbourhood. The Common Heron is abundant all the year round in the lagoon of Enzeli.

Ardea purpurea, L. Purple Heron.

I never saw the Purple Heron in winter, though Zarudny records it as present in winter and also breeding in his "South Caspian region". It appeared at Enzeli in the second week in April and was common all through the summer.

Egretta alba (L.)—Great White Heron.

The Great White Heron is common in winter both in the lagoon and along the actual sandy shore of the Caspian. The fact that I never saw it in summer is probably due to my having been unable to explore the lagoons at that time of year.

Egretta garzetta (L.)—Little Egret.

The Little Egret was common in winter on and about the water-buffaloes all round the lagoon.

Ardeola ralloides (Scop).—Squacco Heron.

I shot two *males* of the Squacco Heron on 29th April at Enzeli feeding among cows in a marsh. I had not seen the species before and had I not collected them should certainly have recorded "Squacco Heron arrived, *paired.*" The testes of both were enlarged.

Nycticorax nycticorax (L.)—Night Heron.

Small flocks of Night Herons are common at Resht and Enzeli in the winter, and I saw single birds in April and June. I have no doubt that they were breeding locally, but I have already explained why it was impossible to get definite breeding records for any of the marsh birds.

Botaurus stellaris (L.)—Common Bittern.

I saw a Common Bittern shot from a reed bed by the Kara Su at Kermanshah on 29th November 1918, and I saw the species occasionally in the reed beds round the Enzeli lagoon in winter.

Phœnicopterus ruber antiquorum, Temm.—Flamingo.
(*P. roseus*, Auctt.)

I saw a flock of a dozen adult Flamingoes in July at Tula Rud, mid-way between Enzeli and Astara.

Cygnus cygnus (L.)—Whooper Swans.
(*C. musicus*, Auctt.)

I saw two adult Whooper Swans in the lagoon between Enzeli and Resht on 11th February. Capt. Ingoldby obtained a specimen, which was one of two that had been caught alive in a flight net, and which a boy was carrying alive to market. These flight nets are used with great effect in winter, at any rate against the ducks; they are spread across channels of water among the reed beds, and are often a couple of hundred yards long.

Anser, sp.

Grey Geese were common, but I never got one. I do not think they are killed in the flight nets except perhaps in very windy weather.

Tadorna tadorna (L.)—Common Sheldrake.

I saw a flock of 200-300 Common Sheldrakes on the lagoon on 16th February. That was the only time I saw the species.

Anas platyrhyncha platyrhyncha (L.)—Mallard.
(*Anas boschas*, Auctt.)

Anas crecca crecca (L.)—Common Teal.

Nyroca fuligula (L.)—Tufted Duck.

Mergus albellus, L.—Smew.

Buchephala clangula clangula (L.)—Golden Eye.

Nyroca ferina ferina (L.)—Common Pochard.

Netta rufina (Pall.)—Red-crested Pochard.

Anas penelope, L.—Wigeon.

Anas acuta, L.—Pintail Duck.

The Mallard and Common Teal were very common on the Resht side of the lagoon, that is to say, the inland, freshwater side, in winter. At Enzeli, that is to say, on the Caspian side, both on the lagoon and on the sea itself, they were relatively rare among the huge numbers of more truly marine ducks. At Enzeli the commonest duck of all was the Tufted, but Smew and Golden Eye were extremely abundant, Common and Red Crested Pochard hardly less so. Wigeon were quite common, Pintail occurred, but not in great numbers. The local people all stated that relatively speaking duck, geese and swans were not abundant during the winter of 1918-1919, and this was believed to be due to the N. end of the Caspian being less frozen over than it is in some years. Still it is curious that I never saw any of the following ducks which are recorded by Zarudny for this part of Persia:—Goosander, White-headed Duck (*Eris matura leucocephala*), Scaup, Long-tailed Duck, Common and Velvet Scoters

Marbled Duck, Shoveller, Gargany, Gadwall and Ruddy Sheldrake. I am sure that I saw tens of thousands of ducks, on the sea and in the lagoon, and exposed for sale in the bazaar.

I do not know at what time the various species arrived in the lagoon; when I left Enzeli on 31st October 1919 it appeared that none had arrived. As to their departure in spring, in early February 1919 we had very warm weather and the duck at once became scarcer. The end of February was cold and wet but they continued to become fewer still, and were "scarce" on 28th February. By 15th March the only species left were "Smew, Golden Eye, Tufted Duck and Mallard, a few of each". After 31st March I never saw a duck except small parties of Tufted Ducks the last of which was seen as late as 26th April.

Mergus serrator, L.—Red-breasted Merganser.

I flushed a female Red-breasted Merganser from a ditch at Menjil on 1st April 1919. I saw the bird twice at very close quarters and am certain that it was a Merganser (*M. serrator*) and not a Goosander (*M. merganser*). Zarudny only records the Merganser from Seistan and the Persian Gulf.

Nyroca nyroca nyroca (L.)—White-eyed Duck.

Ingoldby told me that the White-eyed Duck was commoner than any other species at Bander-i-Gaz in Asterabad Bay in the S. E. Caspian, but I never saw it at Enzeli.

Podiceps cristatus cristatus (L.)—Great Crested Grebe.

1 ♂, 5th February—Enzeli (wing 198 mm. culmen. 52 mm.).

The Great Crested Grebe was extremely common in January in Enzeli harbour, and on the lagoon and the Caspian. All the birds disappeared in the third week in February.

Podiceps ruficollis capensis, Salva.—Little Grebe.
(*Podiceps fluviatilis capensis*).

1 ♂, 2nd March.—Enzeli.

The Little Grebe is common and resident in Enzeli lagoon and harbour. It is an interesting fact that the Little Grebe of a country so far north as Gilan is the form which inhabits India and Tropical Africa, not that which inhabits Europe.

Pelecanus onocrotalus (Sub-sp ?) L.—Roseate Pelican.

1 ♂, 1 imm. Resht, lagoon. January and February (male wing, 685 mm. culmen 386 mm.)

Pelecanus crispus, Bruch.—Dalmatian Pelican.

1, Resht lagoon.

Both the Roseate and the Dalmatian Pelicans may be seen in large flocks on the south side of the lagoon during the winter, though the Roseate is far the more abundant. The two species rest together on the same mud-bank, but I do not know whether they go out on mixed fishing parties. I have no note of the date of their departure, but they certainly do not remain on the lagoon for the summer.

The single adult specimen of *P. onocrotalus* is small, but on geographical grounds probably belongs to the typical race. The tail is defective.

Phalacrocorax carbo (L.)—Common Cormorant.

The Common Cormorant is abundant all the year round at Enzeli and in winter wanders inland at any rate as far south as Menjil. It breeds in great numbers to judge from the dozens of old birds one sees flying towards the lagoon with nesting material, but I was never able to follow them. In early April the Cormorant appears to be more than usually abundant. Flocks of some thousands spent the day defiling the sandy margins of the Caspian, and every morning about 8 a. m. between 19th and 15th April one saw mile-long flights following each other eastwards. These flights were close over the sea about half a mile from shore. My skins have failed to reach home.

Phalacrocorax pygmæus (Pall.) Pygmy Cormorant.
1 ♀, 30th January—Resht.

The Pygmy Cormorant is common in the lagoons in winter and was seen as late as 17th April. I was on the lagoon in a launch for several hours on 2nd June and never saw it. Zarudny does not state that they breed in this part of Persia, but one would have certainly expected them to do so.

Pterocles orientalis arenarius (L.)—Imperial Sandgrouse.
1 ♂, 18th June—Tehran (R. E. C.).
1 ♂, 1 ♀, September—Qazvin.

The Imperial Sand Grouse appeared at Qazvin in early February (Ingoldby). Cheesman found it paired and apparently breeding in various places in the plateau, from Hassanabad to Qazvin and Tehran. The male (18th June) had "organs not very advanced, iris brown, bill plumbeous, toes whitish grey." It is almost inconceivable that Sand Grouse should suddenly appear at Resht in spring, in view of the general swampiness of the ground and the constant rain: nevertheless a flock of a species which I could not identify certainly lit on the aerodrome at Resht on 5th March, and at that time the aerodrome was partly under water: this party of birds only stayed for a few hours.

Columba palumbus, L.—Wood Pigeon.

I saw Wood Pigeons between 3rd March and 27th April at Noglabar, Enzeli, &c.

Streptopelia turtur (L.) (sub-sp. ?) Turtle Dove.

The Turtle Dove arrived at Enzeli on 27th April and remained all through the summer: I saw it also at Astara in the beginning of July. It is exceedingly unfortunate that I did not secure skins: we may I think safely presume that they belong to the European race.

Burhinus œdicnemus œdicnemus (L.)—Stone Curlew.
1 sex ? 21st September—Qazvin.
1 ♀, 16th October—Enzeli harbour.

Both the specimens of Stone Curlews belong to the typical race, which Zarudny has already recorded breeding and on migration in the Caspian Provinces and N. W. Persia. The specimen from Enzeli harbour was of course on passage, and I believe the one from Qazvin also; at any rate I never saw the bird there until the day on which I killed this specimen out of a flock of 20. I have a specimen of *B. oe. astutus* from Khaniqin in Mesopotamia, close to the Persian border.

Hæmatopus ostralegus ostralegus, L.—Oyster Catcher.

Oyster Catchers were plentiful at Enzeli throughout the last three weeks of April: they occurred in large flocks.

Cursorius gallicus (Gm.)—Cream-coloured Courser.

I saw Cream-coloured Coursers in October between Qazvin and Teheran. They always frequented desert overgrown with Liquorice (*Glycerrhiza*) and were extremely wild. Specimens are very desirable.

Charadrius asiaticus, Pall.—Caspian Plover.
1 ♂. 1 ♀, 1st May—Enzeli.

The pair shot were the only Caspian Plovers I ever saw Enzeli was a most disappointing place for Waders.

Charadrius dubius, Scop.—Little Ringed Plover.

The Little Ringed Plover breeds at Enzeli, and at Astara, on the banks of sand along the edge of the Caspian. I have no note or recollection of its presence in winter.

Charadrius alexandrinus, L.—Kentish Plover.

The Kentish Plover appeared at Enzeli on 14th April in pairs, and I expected that they would breed, but they certainly disappeared from the small area I was able to investigate.

Vanellus vanellus (L.)—Peewits.

I saw Peewits at Karind on 27th November. Round Resht and Enzeli they were common in winter in small flocks in the rice fields. They disappeared by mid-March.

Numenius phæopus, L.—Whimbrel.

The Whimbrel was common on the shore at Enzeli in flocks from the second week in April until early May.

Numenius arquata, L.—Common Curlew.

Recurvirostra avocetta, L.—Avocet.

Erolia alpina, L.—Dunlin.

Tringa nebularia, Gunner.—Greenshank.

The Common Curlew, Avocet, Dunlin and Greenshank, were all identified in January and February on the Resht lagoon. None of them were abundant.

Tringa totanus, L.—Redshank.

I saw Redshank commonly on the marshy borders of the Kara Su at Kermanshah at the end of November 1918; round Enzeli and Resht in March, but not in winter. They were probably passing through on migration, as I never saw them in winter.

Tringa hypoleuca, L.—Common Sandpiper.

The Common Sandpiper passed through Enzel at the end of April and in early May.

Tringa ochropus, L.—Green Sandpiper.

I saw Green Sandpipers at Karind and Kermanshah at the end of November 1918.

Gallinago gallinago, L.—Common Snipe.

The Common Snipe is common in the plateau in winter (Kermanshah, Qazvin,) wherever the ground is suitable. It is extremely abundant round the marshes and lagoons in Gilan in winter and one flushes them in tens at a time The species became scarcer after the middle of February, but I saw a few as late as 17th April. The Snipe returned to the low lands in early September, but even in mid October one only flushed them in twos and threes.

Gallinago media (Lath.)—Great Snipe.
(*G. major*, Gm.)

The Great Snipe passes through Enzeli every year on migration at the end of April and in early May, as the local sportsmen well know.

Limnocryptes gallinula (L.)—Jack Snipe.

The Jack Snipe was common in winter round the lagoons though not so extremely abundant as the Common Snipe. One or two were seen as late as the 17th April at Enzeli, and the bird returned in the middle of October in small numbers.

Scolopax rusticola (L.)—Woodcock.

1 ♂, 3rd December 1918—Kermanshah.

Woodcocks were common in the little wood above Kermanshah at the end of November and in early December and I was informed that they remain there all the winter. They are abundant in winter in the forest of Gilan (Resht, Enzeli. Noglabar, &c.). My latest record in spring is 20th March, and I do not know when they return in the autumn.

Larus argentatus cachinnans. Pall—Herring Gull.

1 ♀, Enzeli—2nd March.

In January and February this race of the Herring Gull was very common in Enzeli harbour, and a very few remained through March. After that the species was completely absent, including young birds, all through the spring and summer, and it had not returned when I sailed from Enzeli on 30th October.

Larus ridibundus, L.—Black-headed Gull.

The Black-headed Gull is abundant round fresh and salt water at Resht and Enzeli in winter. They were last seen in the third week in March and had not appeared again on 31st October.

Larus canus canus.—Common Gull.

1 ♂, 1 ♀, Enzeli and Resht—February.

The Common Gull was common at Enzeli, and quite infrequent so far inland as Resht. It was last seen in the third week in March and had not returned by 31st October. Male wing 390, culmen 34 mm; female wing 340, culmen 30 mm.

Larus ichthyœtus, Pall.—Great Black-headed Gull.

The Great Black-headed Gull is not rare in winter in the less frequented parts of the lagoon, but it is extremely shy and I never obtained a specimen.

Sterna tschegrava, Lepechin.—Caspian Tern.
(*S. caspia,* Pall.)

Large flocks of Caspian Terns frequented the sandy shore of the Caspian at Enzeli in the first fortnight of April. I never saw them at any other time.

Otis tarda, L.—Great Bustard.

I saw four Great Bustards, all apparently adult, among liquorice (*Glycerrhiza*) in the desert at Harunabad on 27th November 1918.

Porphyrio poliocephalus seistanicus Zar. and Härms (1911).—Purple Coot.
(*P. p. caspius,* Hartert, 1917).

1 ♀, 16th February—Resht.

Zarudny separated the Purple Coot of Seistan as *P. p. seistanicus* from the Caspian bird, and stated that the form from Seistan differs in the paler colour of all parts of its body. Hartert (1917), overlooking Zarudny's description, described *P. p. caspius* from Lenkoran, but Zarudny's name must stand though his description is quite misleading, for birds from Seistan and the Caspian are identical. Hartert states quite correctly that there are no colour differences between specimens from India, Seistan and the Caspian litoral: on the other hand the Caspian and Seistan specimens are larger than those from India (the terra typica), and Ceylon, and not only is the wing longer, but the bill is much more stoutly formed. The wing of my female from the Resht lagoon measures 263 mm., that of a female from Lenkoran (Tring Mus.) 260, and a series from Seistan (Tring Mus.) males 277-285 mm., females 258-275. The bill of the Resht specimen measures from the point to the anterior edge of the nostril 29 mm, and to the posterior edge of the shield 63 mm. The species is quite common in the dense reed beds which surround the lagoon at Enzeli.

Purple Coots of this species are resident in the great marshes which lie on either side of, and between the Tigris and Euphrates in the lower part of their course. A small part of one of these marshes, the Hor Hawezeh, lies in Persian territory. Zarudny tells us that he has heard of the existence of Purple Coots in this place (the "Chauwizeh oasis"), and that he presumes them to be *P. cæruleus.* I have a series of these birds from lower Mesopotamia, none of them actually shot on Persian soil, but all of them from marshes which are continuous with the Hor Hawezeh, and they belong to *P. poliocephalus* and not to *P. cæruleus.* They differ from specimens from Seistan and the Caspian, in their smaller size. Dr. C. B. Ticehurst, who is working on the birds of Mesopotamia, informs me that they are inseparable from the typical Indian and Ceylonese race.

Rallus aquaticus korejewi, Zar.—Water Rail.

1 ♀, Resht—16th February.

This specimen was shot from reeds at the side of the lagoon between Resht and Enzeli: the ovaries were not enlarged; the wing measures 127 mm., the bill 45 mm. (exposed culmen). Woosnam's specimens from the "S Coast of the Caspian" are also referable to this form.

Water rails vary considerably in the colours of the dorsum, in any one locality. This race is distinguished by its pale dorsum, which is an olive brown rather than a reddish brown, but there seems to be a certain amount of overlapping between *R. a. korejeur* and *R. a. aquaticus*. It appears to range from Babylonia through Central Asia to E. China and to be found in India in winter.

Fulica atra, L.—Common Coot.

The Common Coot is extremely common on the lagoon, and on deeply flooded rice fields in winter, but I have no record of seeing it after the third week in March at all.

Porzana porzana, (L.)—Spotted Crake.
(*P. maruetta*, Leach).

1 ♂ Menjil—31st March.

My only record is a specimen picked up dead under a telegraph wire; the testes were small.

Coturnix coturnix coturnix, L.—Common Quail.

1 ♀, 20th April—Enzeli.

The Common Quail was fairly common at Enzeli from 14th April till early May among wild pomegranate bushes just inland of the sand hills.

Perdix perdix canescens, Butur.—Common Partridge.

1 ♂, 1 sex ? October—Zinjan (C. M. I.)

The two specimens of the Common Partridge obtained for Ingoldby at Zinjan are a male and female just passing into adult plumage. They agree fairly well with specimens from Eregli and Lake Urumiyah, and Dr. Hartert is inclined to refer them to the form described as *canescens* by Buturlin from Transcaucasia. Specimens of the Common Partridge from any Asiatic locality are very rare in British collections. I never heard of this species being seen round Qazvin, and am fairly confident that it does not occur there: I believe that in Persia it is confined to the province of Azerbaijan. Blanford records it on hearsay as far east as the Tehran neighbourhood.

Alectoris græca (Brisson) (*Caccabis chukar*, G. R. Grey).—Chukor.

The Chukor is common and often abundant all over the rocky hills in all the parts of Persia which we visited, and in winter it comes down in to the plains, so that in snowy weather it is sometimes found quite close to Qazvin. It does not really enter the Gilan forest though I have seen it among thick trees at Noglabar. Cheesman saw it as high as 10,000 feet, in the mountains behind Tehran in June.

Ammoperdix griseogularis griseogularis (Brandt.) (*A. bonhami*, G. R. Gray.)—See See.

4 ♂, 2 ♀, S. of Menjil—October.

The See See of the Elburz is undoubtly the typical race. Though the species was not widely distributed like the Chukor it was locally common in the dry stony hills S. of Menjil. This country resembled the country round Qasr-i-Shirin, where the other form of the same bird was so common; the species frequents ground which is hillocky rather than mountainous and was abundant round Menjil among the innumerable nullahs. One hardly saw the birds by day but in the dusk they came down on to the main road and fed on mules droppings; at that time they were very tame.

Ammoperdix griseogularis ter-meuleni Zar.—Persian See See.

2 ♂, Qasr-i-Shirin—24th November 1918.

This race of the See See, which appears to be found in N. Mesopotamia, W. Persia and S. W. Persia was only obtained at Qasr-i-Shirin. Males of the two races are not so easy to separate as females but these are freshly moulted and I am satisfied with the identification.

Phasianus colchicus talyschensis.—Caspian Pheasant.

1 ♂, 1 ♀ January—Resht.
1 ♂, March—Noglabar.
1 ♂, 1 ♀, Bandar-i-Gaz (C. M. I.).

This race of the Pheasant is common both on the northern slopes of the Elburz, and low down in the extremely marshy forest close to the Caspian. Ingoldby flushed the birq at Bandar-i-Gaz from small tufts of rice straw in wet paddy fields in winter, and they are not rare in the dense reed beds, round the Resht lagoon country in which Purple Herons, Gallinules and Water Rails seem more naturally at home. If one were to judge from the few specimens at Tring and the British Museum, and the three males at my disposal one would conclude that the white ring so characteristic of some Eastern Pheasants was represented solely by an occasional white-tipped feather in some males and not in others, but this is far from being the case. I have seen many scores of specimens in the bazaars of Resht and Enzeli and a small proportion of them have very nearly complete white rings to their necks, but are in other respects typical *talyschensis*. The throats of these specimens had been cut almost to the point of decapitation, and I preserved no skins. Pheasants are sold for about one toman, approximately eight shillings, a price sufficient to put every gunner's hand against them.

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From the JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, JULY 31, 1921.]

No. XXIX.—EARWIGS FROM MESOPOTAMIA AND N. W. PERSIA.

Though I am in no sense a specialist in the *Dermaptera* it seems worthwhile to put on record the following species of the group captured in Mesopotamia and N. W. Persia in order to make as complete as possible our knowledge of the fauna of these countries. My own specimens have been determined by Prof. Borelli of Torino who is unable at present to record them, and I have compared with them a number of specimens taken by Capt. W. E. Evans, R.A.M.C., at Amara, which have been lent to me for the purpose.

Forficula auricularia, L., July 1919, Qazvin, N. W. Persia; common.

Euborellia annulipes, Lucao, 13th September 1917, Baghdad, 10th March 1918, Amara, under clods of earth. Immature specimens apparently of this species, December 1918, Qizil Robat, under clods (W. E. E).

Labidura ribaria, Pallas, 27th June to 27th August 1918 (W. E. E.), Amara, common at light 5th August 1918, Mendali. The varieties *inermis* and *mongolica* were present with the type form. This is without doubt the species referred to by Lt.-Col. F. P. Connor, in his interesting note Journ. B. N. H. S. XXVI. No. 2. as carrying off a moth in its forceps from a mess table. 4th April to 14th July 1919, Enzeli, Caspian Sea, N. W. Persia, Var. *mongolica*, Rehn, abundant among driftwood and rubbish on the shore. On 14th July after sunset on the beach I saw a white object moving among driftwood. I found that it was a small fish, dead and dry, being carried by one of these large earwigs in its forceps. The above three species are very widely distributed and their occurrence in Mesopotamia and N. W. Persia is in no way remarkable.

Psalis femoralis, Dohrn var., 27th June to 10th August, Amara, not common at light (W. E. E. and P. A. B.). Prof. Borelli tells me that these specimens only differ from *P. femoralis*, Dohrn, in lacking a brown spot on the femur, and being without a metallic reflection on the elytræ in these particulars they agree with what Dohrn described as *P. plebeja*, which is probably a variety of *P. femoralis* and has at present only been recorded from Java. In any case the occurrence of *Psalis*, an Oriental genus, in Mesopotamia is of considerable interest.

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March 1921.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 30, 1921.]

THE BUTTERFLIES OF MESOPOTAMIA.

BY H. D. PEILE, F.E.S.

(With a plate*.)

As but little appears to be recorded on the butterflies of Mesopotamia and their habits, the following notes on some 44 species recently taken there, and on some 44 others taken in the adjacent highlands of North West Persia and Kurdistan by members of the Society may be of interest to collectors.

The forms here mentioned include those taken by Major T. D. Broughton, R.E., Captain P. A. Buxton, R.A.M.C., Major F. C. Fraser, I.M.S., Lieut.-Colonel C. H. Watney, I.A., by myself and a few others.

Many of these notes were hastily put together when on Field Service; being now in England I have, through the kind permission of Dr. C. J. Gahan at the British Museum of Natural History, South Kensington, been so fortunate as to have had my collection, most of which has now been set up, gone through by Capt. N. D. Riley who has found a number of forms to be new, including a very interesting new Lycæna whose males are orange-yellow instead of the usual blue. I have also to thank Capt. Riley for permission to quote from his notes on my specimens many of which are now incorporated in the National Collection. Some specimens were at first identified by Lieut.-Col. W. H. Evans, D.S.O., R.E., and by Mr. H. T. G. Watkins whom also I have to thank for notes upon variation, races, etc.

Mesopotamia, situated between the Persian Gulf to the South, the mountains of Armenia and Persia to the North, East and South East, and deserts on the West and South West, may be divided into :—

1. A plain of river-silt with immense stretches of marsh and desert, extending from the Persian Gulf to about 300 feet above sea level, and with the Euphrates, Tigris and Karun winding through it.
2. An upland region of undulating sedimentary plateaux, alternating with ridges of sandstone, conglomerate and gypsum; extending from about 300 feet to a little over 800 feet elevation, and gently rising to meet the foot-hills near the border; the gypsum often standing out conspicuously white in the landscape. In the spring this region is a gorgeous carpet of flowers, among the earliest being small marigolds, patches of a mauve stock; white, blue and several shades of purple anemones. Clumps of a large crimson ranunculus and poppies make a rich mosaic with various yellow and mauve crucifers; white and yellow marguerites; blue irises, borage and lupins, and pastures gold with buttercups. Later, sprays of rue, and later still, when all these are long over, a lowgrowing thistle here makes stretches of yellow upon the plateaux. This thistle, common everywhere, here makes up with the sharpness of its long needle-like spines for the almost complete absence of stinging nettles both here and in the highlands beyond the border: liquorice, a luxuriant jungle in the lower alluvial region, continues as rather a stunted plant up onto the plateaux of the highlands. Tamarisk spreads along the margins and beds of the rivers. There too and in moist hollows umbellifers cover immense areas. The green stems and leaves and white flower-clusters of the latest of these (*Ammi visuaga*, Lam.) stand out conspicuously brilliantly, when almost all else has been dried up and withered by the summer heat. In Macedonia, as remarked by Mr. Mace in the *Entomologist*, the same conditions occur. Flowering mint along the margins of water-channels attracts large numbers of butterflies both in Mesopotamia and in the highlands.

*The plate has not been received in time to be included in this number, and will be issued later.

Beyond the border to the North and North East are steep limestone mountain ranges rising from about 2,000 feet, as at Paitak at the foot of the Takigerra pass in Persia, where in August the satyr—*S. parisatis*—settles in scores in the water-worn holes of the limestone cliff, up to plateaux at 5,000 and 6,000 feet, such as the Kerind Valley, with peaks of 8,000 feet on either side, or 11,000 feet as near Kermanshah. At four to five thousand feet stunted and other hill-oaks are found; and one may come across the silk cocoons of some large moth, related to the 'moon moth', attached at about 5 feet from the ground to some thorny bush, about which the crimson and yellow leaves of autumn produce a wonderful effect against the grey-blue of the limestone rocks and boulders of the hill side. Near the streams in the gorges and beautiful clefts through the ranges are walnut, mulberry and other fruit trees, the haunt of the magnificent fritillary, *A. maia*, and of the familiar Purple Hair-streak (*Zephyrus quercus*) of England. In the glades many richly coloured blues are found, such as *Lycæna dama*, and *C. thersamon*, the latter a tailed copper, shot with purple.

Humidity.—This in the lower or alluvial region is fairly high from November to April, and low from June to September, when in the undulating uplands it is very low.

Temperature.—In both regions January is usually the coldest month, and there are frosts at night in the winter. Rarely, as in four days in February of 1920, when the rain was late, there is snow. The mean daily temperature varies from about 40° F. in the cold season to about 90° in the Summer. The maximum reaches to over 130° in the shade in July in the alluvial region and to 120° or more in the higher region in August.

These conditions would account for so called 'Wet' season forms in February and October, and extreme Dry forms met with in June in the uplands whereas in the highlands beyond a comparatively 'Wet' season form is still to be found in July, as instanced by the bath white (*daplidice*) one of the commonest forms in some parts of Mesopotamia.

The butterfly species of Mesopotamia are comparatively few. In the alluvial region such as at Amara they probably do not exceed a dozen in number. But on the uplands of undulating plateaux and "Jebels," as the low hill ridges are called, and on the foothills, some 40 forms occur to my own knowledge.

On these uplands the earliest broods appear towards the end of January, but cold may delay them a month or more, as in 1920; and in the Spring, especially early in May, with the wonderful profusion of flowers there is a corresponding abundance of butterflies, that is of individuals of some half dozen or so species, *P. machaon, Colias croceus* (= *edusa*) *Synchlœ belemia*, etc., being there seen in astonishing numbers. But in June the numbers rapidly diminish here, as the heat asserts itself, whereas in the highlands in July the abundance of lepidoptera is again amazing. The satyrs, *Epinephele jurtina* and *E. lupinus*, for instance, rise up in fluttering clouds accompanied by numbers of the gorgeous "Jersey Tiger" *Callimorpha quadripunctata* (= *hera*), as one moves about beneath the trees. In October some new broods appear, but not in such numbers as in the Spring. A few, such as the small cabbage white (*rapæ*), bath white (*daplidice*) and clouded yellow (*crocea* = *edusa*), continue almost throughout the year.

In character the butterfly fauna of Mesopotamia, like the flora, which of course largely determines it, is much more English than that of the fauna of say, the South of France, and the fact that a large proportion of the forms are either the same as or nearly akin to English species at once strikes the collector; *machaon*, for instance, is the only *Papilio* found below the highlands; and other examples of English forms are *rapæ, daplidice, croceus* (= *edusa*), *pamphilus* and *atalanta*; besides the more widespread brown argus (*astrarche*), *megœra*,

ticarus, and *flava* (= *thaumas*); and of course the ubiquitous painted lady (*cardui*) and long tailed Blue (*bœticus*).

It is noteworthy that although *P. machaon*, *Melitea persea* and *Euchlœ* are found together on stony ridges as in India, their other associate there, *Ypthima holanica*, is not represented in Mesopotamia by any of its genus.

The Editor has asked for Keys and brief descriptions so that collectors may recognize their captures.

A. Forms from Mesopotamia :—

DANAIDÆ.

1. *Danais chrysippus*, L.

SATYRIDÆ.

2. *Pararge megœra*, L. Subsp. *iranica*, Riley.
3. *Satyrus telephassa*, Hb.
4. ,, *persephone*, Hb. (=*anthe*, O.) f. *hanifa*.
5. ,, *briseis*, L. Subsp. *magna*.
6. *Epinephele lupinus*, Costa. ssp. *centralis*, Riley.
7. *Precis* (*Junonia*) *orithya*, L. Subsp. *here*, Lang.
8. *Pyrameis cardui*, L.
9. ,, *atalanta*, L.
10. *Polygonia egea*, Cr.
11. *Melitœa trivia*, Subsp. *persea*, Koll.

PAPILIONIDÆ.

12. *Papilio machaon*, L. Subsp. *centralis*, Stagr.
13. *Thais cerisyi*, Bdv. var. *deyrollei*, Ob.
14. *Doritis apollinus*, Herbst.

PIERIDÆ.

15. *Belenois mesentina*, Cr.
16. *Pieris rapœ*, L. Subsp. *iranica*, LeCerf.
17. *Pontia daplidice*, L.
18. ,, *glauconome*, Klug.
19. ,, *chloridice*, Hb.
20. *Euchlœ ausonia*, Hb. Subsp. *persica*, Ver.
21. ,, *belemia*, E.
22. ,, *charlonia*, Subsp. *transcaspica*, Stgr.
23. *Zegris eupheme*, E. Subsp. *dyala*, Peile.
24. ,, ,, Subsp. *tigris*, Riley.
25. *Colias croceus*, Fourc. (= *edusa*, Fab.)
26. *Teracolus* (=*Colotis*) *fausta*, Ol.

LYCÆNIDÆ.

27. *Lycœna astrarche*, Berg.
28. ,, *icarus*, Rott. Subsp. *persica*, But.
29. *Heodes* (*Chrysophanus*) *phlœas*, L.
30. *Zizera karsandra*, Moore.
31. ,, *otis*, Fak.
32. *Chilades galba*, Led.
33. ,, *trochilus*, Frey.
34. *Lampides* (*Polyommatus*) *bœticus*, L.
35. *Tarucus theophrastus*, Fab.
36. ,, *balcanicus*, Fr. *areshanus*, B. Baker.

HESPERIIDÆ.

37. *Carcharodus alceæ*, E.
38. *Gegenes nostrodamus*, Fabr.
39. ,, *lefebvrei*, Rambur.
40. *Thymelycus* (*Adopœ*) *lineola*, Ochs.
41. *Hesperia geron*, Watson.
42. ,, *proto*, Esp.
43. ,, *alveus*, Hbn.
44. *Parnara mathias*, Fab.

B. Additional forms from N. W. Persia and Kurdistan :—

45. *Agapetes larissa*, Subsp. *iranica*, Seitz.
46. *Cœnonympha pamphilus*, L. f. *hylas*, Esp.
47. ,, *saadi*, Koll.
48. *Satyrus pelopea*, Klug.
49. ,, *hermione*, L. Subsp. *syriaca*, Stgr.
50. ,. *circe*, F.
51. ,, (*Nytha*) *parisatis*, Koll.
52. *Epinephele jurtina*, L. Subsp. *persica*, LeCerf.
53. ,, *telmessia*, Subsp. *kurdistana*, Ruhl.
54. ,, ,, Subsp. *palescens*, Butler.
55. ,, *mandane*, Koll.
56. *Limenitis rivularis*, Scop. (=*camilla*, Auctt.)
57. *Argynnis maia*, Cr. (=*pandora*, Schif.)
58. ,, *latona*, L. (=*lathonia*, Auctt.)
59. *Melitœa didyma*, Subsp. *casta*, Koll.
60. *Polygonia* (*Vanessa*) "C" *album*, L.
61. ,, ,, *egea*, Subsp. "J" *album*.
62. *Libythea celtis*, Fuess.
63. *Papilio podalirius*, L.
64. *Pieris napi*, L. *pseudorapœ*, Ver.
65. ,, *ergane*, Hbn.
66. *Euchlœ gruneri*, H.-S. Subsp. *armeniaca*, Chr.
67. *Gonepteryx farinosa*, Z.
68. *Lycœna dama*, Stgr. Subsp. *karinda*, Riley.
69. ,, *peilei*, B. Baker.
70. ,, *damone*, Ev. Subsp. *damalis*, Riley.
71. ,, *admetus*, Stgr.
72. ,, *bellargus*, Rott.
73. ,, *baton*, Berg. Subsp. *clara*, Stgr.
74. *Heodes* (*Chrysophanus*) *thersamon*, Esp. *kurdistana*, Riley.
75. ,, ,, ,, Esp.
76. *Cyaniris argiolus*, L.
77. *Aphnœus epargyrus*, *marginallis*, Riley.
78. ,, *acamas*, Klug. *hypargyros*, Butler.
79. *Cigaritis maxima*, Staud.
80. *Zephyrus quercus*, Dal. *longicauda*, Riley.
81. *Strymon* (*Thecla*) *abdominalis*, Gerhard, f. *gerhardti*, Staud.
82. ,, ,, *ilicis*, E. *caudatula*, Zell.
83. ,, ,, *marcidus*, Riley.
84. *Eogenes alcides*, Herr. Schaeff.
85. *Thanaos marloyi*, Bov;
86. *Carcharodus altheæ*, *bœticus*, Rambur.
87. *Hesperia orbifer hilaris*, Staud.
88. *Thanaos tages*, L. var. *unicolor*, Freyer.

The eight forms named by Riley, one by B. Baker and one by the writer were found to be new.

DANAIDÆ.

Genus DANAIS, Latr.

D. chrysippus, L., Seitz. Vol. 1·28 c. F. Br. Ind. (Bingham), Vol. I, Pl. 1.

Key: Tawny brown, f.w. with white bar of spots near apex. Terminal margin of wings black with white dots.

The Mesopotamian form is f. *chrysippus.*

Seen in small numbers in June and again in Oct., Nov. and December; frequents thistles and mint flowers.

Localities —Basra and Kut-el-Amara, seen occasionally (Major T. D. Broughton); Kizil Robat; Khanikin, S. E. Europe, S. Asia, the whole of Africa and Malayan and Australian region.

ab. *alcippoides,* M., one example taken at Kizil Robat, Nov. 17th at mint, having two-thirds of disc of hindwing white. The writer has not come across in Mesopotamia the *Asclepias* species which is the usual food-plant in India.

Genus AGAPETES, Billb.

A. larissa, Hb. Subsp. *iranica,* Seitz.

Key: An irregular broad discal cream white band across both wings; basal and postdiscal portions of wings black, an oblong black spot in centre of forewing.

Upperside ♂ forewing ground colour, cream white; basal third mostly black; a sinuous black line across cell, the outer and posterior portion of the cell within this line cream white; an oblong black spot in centre of wing, between veins 3 and 4, and another black blotch to its inner side anteriorly. Apex black with two large spots of the ground colour a submarginal row 7 spots of the ground colour one in each interspace and connected with a corresponding submarginal row of small conical spots.

Hindwing.—Basal third black except for a bar of the ground colour from its centre forwards. A broad angled discal band with indications of two ocelli in it posteriorly, a submarginal row of conical cream white spots and black marginal line.

Underside ♂ darker cream tinted. Forewing a sinuous black line across middle of wing, and two black blotches near posterior angle. *Hindwing* ♂ there are indications of three black ocelli posteriorly and of one anteriorly; and of a row of black sagittate markings beyond these.

This form from the Karind valley in N. W. Persia is fairly normal and almost devoid of markings beneath. It is in June and July very common at 5,300 ft. By July 13th the great majority of individuals seen had the wings very much torn, apparently by the long needle like spines of the yellow thistle which it frequents. It is a heavy flier and very easily caught. None were seen later than July. The species seen by Lt.-Col. Watney on June 18th in the Bazian Pass in S. Kurdistan was probably this.

1 ♂, 14 ♀♀ from the Karind valley, July 13-17, 1918; all except 8 ♀♀ are now in the British Museum. Capt. N. D. Riley remarks on them as follows:—

"Figured in Seitz Pl. 39b as *parthica* and placed as a race of *hylata,* Men. In his description of *hylata* Men. expressly states 'base immaculate' and from the rest of his description *hylata* can only be the *Taliche* form of *titea.* Similarly his *teneates* is obviously the *Taliche* form of *japygia.* I am not able to separate *iranica* except as a race of *larissa.*"

Cœnonympha saadi, Koll.

Harir, 15-16 July, 4 ♀.

Note by Capt. Riley:—"Badly worn, certainly not var. *mesopotamica*, Ruhl. which is a much more faintly and differently marked form. The markings approach *mesopotamica* in these specimens in appearance, mainly owing to their worn condition."

Cœnonympha pamphilus, ssp. **hylas,** Esp.

1 ♀, Suwarra, July 1919. (Capt. Aldworth).

GENUS SATYRUS.

A. *Bands above white* .. ..*briseis.*
(Brown tinted forms of ♀ of *briseis* may be distinguished from the following species by their uniform reddish tinted underside)

B. *Bands above brown tinted* .. ..*hermione.*
(The pale band on the hindwing above is much nearer the margin and not central as in *briseis*).

C. *Bands above tawny.*
a. Band containing white dots.
*a*1. Band of f.w. broadly divided at the white dots; underside earth brown .. .. ..*pelopea.*
*b*1. Band not broadly divided underside greyish ..*telephassa.*
b. Band without white dots .. ..*persephone.*

S. telephassa, Hb., Seitz. 1·43c. (87 examples).

This grayling is of a rather dark grey brown ground colour with a subterminal irregular *tawny* band on both wings, containing in f.w. two black, usually white centred, eyespots in interspaces 2 and 5 and between them two white dots, and in h.w. 2 minute, but complete spots in interspaces 1 and 2, the white centres being more prominent. There is always in f.w. a sharp angle or tooth of the ground colour encroaching on the band on its inner side and rarely dividing it; on the h.w. the band does not reach the costa.

♂ with a black and very distinct band or sex-mark in the cell. The ♀ is of course without this and is also a good deal larger.

Underside of h.w. grey striated with darker, and usually with a fairly distinct narrow whitish angled postmedian band.

Expanse:—♂ 60 mm. (2 ¼ in.) ♀ 70 m.m. (2¾ in.). Common both in Mesopotamia on the Dyala at Kizil Robat and a few by the Tigris at Baiji; N. W. Persia, Harir and Kermanshah common.

Kizil Robat, March to May; Khanikin, October; N. W. Persia, Karind Valley, July, August, September; Buxton notes Qasvin, September, worn females found flying among dessicated plants.

S. persephone, Hb., Seitz. 1·42e, Ochs. over 70 specimens.

Larger and darker than either *tetephassa* or *pelopea* and the ♂ ♂ are shaped as ♀ ♀ and of the same size.

♂ with band light ochreous, tinted in places with tawny. The eyespots without white centres, and the dots absent. The prolongation of the band to costa of f.w. from the upper eyespot is narrow and well marked. On the h.w. it does not nearly reach tornus.

♀ with the band bright tawny.

♂ without sexmark.

Underside more boldly marked on both wings than in the other spp. hindwings with a white subterminal line as well as a white postmedian band, which is bordered inwardly with a black line. Expanse 72 mm.

Capt. Riley, having examined 57 of the specimens from Fathah (=Baiji) and Kizil-Robat, remarks:—"All are referable to the form *hanifa*, Nordm. The typical pure white banded form does not seem to occur; the majority of the females have the bands uniformly rich fulvous, but in 3 females and in most of the males they are much broken or almost replaced by pale yellowish. It has been suggested that the dark ochreous and the light forms are seasonal. In Kedos and Yezgat in Asia Minor both extremes seem to occur at the same time, and the species appears to be single brooded as in S. Russia. Col. Peile's specimens are certainly all of the Spring brood and all dark; it is unfortunate he was unable to secure any of the Autumn brood. (As mentioned below, I when without a net put up a few one evening at Nineveh late in October when at Mosul for three days only. H.D.P.) A further character in addition to the white veining of the underside which may serve to separate *S. persephone* from *S. enervata* in the male sex is the great prominence of the black sex-mark of the latter across the bases of areas 1b (part) to 3."

Localities:—Mesopotamia—Bank of Dyala at Kizil Robat, April, May 1919. 32 specimens. Bank of R. Tigris at Baiji near Fathah. April-May 1920, over 40 examples.

In typical *persephone* the veins of h.w. are white below and the bands above often wholly white.

Lt.-Col. W. H. Evans to whom specimens of *persephone* from Baiji (on the right bank of the Tigris) were sent, remarks in epistola:—"The localities Seitz gives are—

anthe.—Black Sea, S. Russia, Armenia, Afghanistan and Persia.
enervata.—C. Asia, Altai, Thian Sham and Turkestan.

The veins underneath in Chitral specimens could hardly be described as white. In yours they are just beginning to be so; so perhaps yours are half way to *enervata* and my Chitral ones (same as C. Asian which I have seen) are *enervata*. Above there seems no difference whatever. In the Spring, Chitral ones are tawny, some males being nearly white. In the Autumn they were all white, with signs of being tawny. The tawny form is *ab. hanifa*."

So far in 1919 and 1920 only the spring brood has been taken, but the writer one evening in October 1919 at Nineveh put up some dark graylings probably of this species. *anthe*, Ochs., is from Russia, and always in the type has white veins on the underside of h.w., but the form *enervata* is without these and is much more tawny and regarded as separate by Elwes, but placed under *anthe* in Seitz.

S. pelopea, Klug. Seitz. 1·43 f.

Similar to *telephassa* but smaller, and the band lighter in colour, ochreous or earthy brown, not tawny, and always in forewing broadly divided by the ground colour below the first eyespot, and in hindwing reaching the costa. The sex-mark of the ♂ is much more obscure, and the white dots of forewing in both sexes more distinct.

Underside of hindwing more brown than grey and more uniformly marked.

Expanse.—♂ 54, ♀ 66 mm.

N. Persia: Karind, Harir and Kermanshah, July 16th to September, nineteen examples, 5 ♂, 14 ♀.

Capt. Riley notes on these specimens:—"Much nearer typical *pelopea* from Syria than to any of the named forms, *persica*, *schahrudensis*, *tekkensis*, &c., the underside not quite so red, more mixed with grey and white, the latter

colour especially prevalent across the disc of the wing, bordering the zig-zag transverse line.

This whiteness or paleness is the most conspicuous feature of the specimens : they are mostly rather worn."

S. parisatis parisatis, Koll.

28 specimens from Paitak, the Takigerra pass and Karind Gorge, from mid July to mid September; and one ab. from Harir mid July 1918. Capt. Riley notes:—"These all belong to the typical form of the species, which was described from Farsistan, the S. E. end of the mountain system which divides the Persian plateau from Mesopotamia and the Persian Gulf. It is characterized by its generally small size, the somewhat indefinite inner margin of the white marginal border of the forewing and the rather strong development of the common white band of the underside.

The general tone of the underside is very *grey* and white."

LeCerf (Ann. d'Hist. Nat. 1913) has overhauled this species excellently and set right a great deal of confusion. The only point which still seems to need investigation is the locality of his type-specimens of *S. parisatis* var. *parcis*, which he describes from Nepal (Tola). It is the B. M. forms from Upper Kumaun, Kangra, Kalapani near Abbottabad, Mandi, Mussoorie, Murree and Urni, but not from further East, nor can I find any record of its having been obtained further East."

Common in N. W. Persia from 2,500 to 6,000 ft. settled in large numbers in holes in the side of a limestone cliff, and at water on the road and on stones around springs. In the open they had to be approached cautiously, but a sweep of the net into the fluttering crowd in a large hole in a rock secured about a dozen at once. An aberration taken at Harir, 16th July 1918, has:—

Underside transverse fascia absent from forewing replaced by a dusky black band on hindwing.

Localities.—N. W. Persia—Paitak, 2,500 ft. at the foot of the Takigerra Pass; by the Greeco-Persian arch in the pass, August 7-8th; and the Karind valley 5,300 to 6,000 ft. mid July to 19th September 1918; Kurdistan, Suwarra, July 1919.

S. circe, L.

A fine famale, taken by Capt. T. P. Aldworth at Suwarra (5,400) early July 1919.

S. briseis, L., sub-sp. **magna,** Stgr., Seitz. I. p. 124. 51 specimens.

♂ Upperside forewing ground colour sooty brown with a cream white discal band broken up into spots by the dark veins. Apical cream patch divided by a black spot and the band containing in the third interspace another spot. Costa and terminal margin dingy cream; two dark blotches divided by discoidal cell.

♀ differs in being larger, with larger eyespots, and with underside usually reddish stone-colour. The hindwing being almost uniformly so.

♀ dimorph (*pirata*, Hb.) with dull chestnut instead of cream bands, otherwise like the normal form of the ♀.

Very common at 6,000 ft. in N. W. Persia, from about the middle of June to end of September. On 27th June 1919 a male in fresh state was taken at Kizil Robat in Mesopotamia, the strong wind blowing at the time having probably carried it from the direction of the Persian hills. At Suleimanyeh in S. Kurdistan a worn male was taken on September 1st, 1919; and on September 21st (1918) a worn female was taken at Harir at 5,800 feet in the Karind valley,

N. Persia. These dates give some indication of its time of occurrence. Most were taken in shady spots by stone walls, rocks and roots of trees; where they were difficult to detect. When put up they flew only a few yards and were easily secured by dropping the net over them with the tail of the net held up when they invariably rose up into it.

Localities:—Mesopotamia: Kizil Robat, the Dyala. N. W. Persia: Karind valley 5,300-6,000 ft. S. Kurdistan: Bazian Pass, Suleimanyeh.

Of 33 specimens examined from the localities above mentioned, Capt. Riley remarks:—"6 ♀ are of f. *pirata*, Esp. All are referable to the ssp. *magna*, Stgr. Underside very sandy. The 1 ♂ from Suleimanyeh has white band of forewing so wide that the blind ocellus of forewing upperside in area 2 is completely separated from the marginal dark border (as in the ♀)."

Buxton notes, Qasvin, 16th July-6th September 1919.

S. hermione, ssp. **syriaca**, Stgr.

1 ♂, 1 ♀, Suwarra; early July 1919, ex. Capt. Aldworth.

Capt. Riley notes:—"Recorded from Lenkoran (S. E. Transcaucasus) by LeCerf. N. Syria nearest locality in B. M. Seitz gives Mesopotamia *i.e.* (probably) Malatia.

Genus PARARGE, Hb.

P. megæra, L., Subsp. *iranica*, Riley, and variety from Mesopotamia.

Compared with English specimens, eyespots somewhat larger, both the dusky ground colour and the tawny marks are paler in tone, these last also reduced in area. The postmedian tawny band of h.w., which is well marked in English specimens and sometimes united with the tawny patches surrounding the eyespots, almost obsolete. Underside greyer, less brown.

18 specimens; Kizil-Robat. 2 ♂♂; 23rd March.

Karind Gorge, ♂, 2 ♀♀; Harir 3 ♂♂, 10 ♀♀, July and August. All except 5 ♀♀ now in the British Museum.

Of these Capt. N. D. Riley remarks:—"Underside of hindwing lighter yellowish than in true *lyssa*, Bois., in that respect agreeing with Herrich-Schaeffer's description of *megærina*. Herrich-Schaeffer states, however that the upperside of *megærina* is that of Hubner's fig. 914, *i.e.*, *lyssa*. The upperside of these specimens is more that of Staudinger's *transcaspica*, *i.e.*, with the much obscured hindwing, but the underside of the hindwing is much darker than in that form. The specimens are rather smaller than *transcaspica* and *lyssa* in the British Museum. Specimens referred by LeCerf to var. *megærina* are probably of this race. I can only regard *megærina* as a form of *lyssa* with yellower underside to the hindwing. The 'differences' given by Herrich-Schaeffer apply equally well to any form of *megæra*.

In addition there are in the British Museum 1 ♂, 1 ♀, from Mungereah Mountains, and 1 ♂, 1 ♀ from Gulek Taurus, which latter though rather larger than the others agree in all other respects.

One of the 2 males taken by Col. Peile at Kizil-Robat is unusually dark on the upperside, the distal yellow spot in area 1b of forewing being almost entirely obscured by black and the fulvous markings being of a very dark shade. The other male taken on the same day is quite normal."

Capt. P. A. Buxton notes:—"2 ♂, 2 ♀, 26-30th March, Menzil. These are not *lyssa*, they are very bright and red on the upperside."

Lt.-Col. Watney took a ♀ at Kizil Robat, February 1919.

The dark Mesopotamian example was taken about the crest of the ridge of the Jebel Kizil Robat about stony hill crests. The ♀ probably at rather lower elevation. Others were taken about the stone walls of vineyards at Harir in N. W. Persia.

Localities:—Mesopotamia—Kizil Robat, ♂ 2, ♀ 1. Feb.-March 1991, N. W. Persia, Harir, Karind valley, ♂ 1, ♀ 5, 13th-15th July 1918.

GENUS EPINEPHELE, Hb.

E. lupinus, centralis, Riley.

♂ not unlike *jurtina* ♂ but smaller, forewing more sharply pointed at apex of a snuff-brown on costa and terminal margin, which shows up the black brand more. Ocellus at apex of f. w. often blind. Hindwing more dentate. Underside of forewing tawny with grey margins and ocellus at apex small and pupilled. Hindwing below grey striated and speckled with darker with traces of a darker central band but no eyespots. ♀ ground colour dark-grey brown, with the terminal area sharply marked off and containing in f. w. two blind eyespots in pale yellow suffused rings. Occurs, but seems to be rare, in Mesopotamia, but in N. W. Persia is abundant in company with *E. jurtina*: at Kizil Robat a few males and a female were taken in April and May 1919 on the bank of the Dyala and one male on the plateau nearby: and three females by the Dyala at the Jebel Hamrin on June 25th in 1918.

Although the male at first sight somewhat resembles a dull meadow brown, the females of the two species are very dissimilar.

Lupinus sometimes settled on leaves in half shade some 5 or 6 feet from the ground.

Regarding 58 specimens from Mesopotamia (11); N. W. Persia (Karind Valley and Kermanshah (45), and Suleimanyeh (2). Capt. N. D. Riley makes the following interesting note:—" Staudiger's description of *E. lycaon* var. *intermedia*, runs as follows: The almost universally common species *E. lycaon* is a species very variable as to size, nature of hair-scales, colour, etc.

The large examples from S. E. Europe with the forewing more lightly covered with long hairs was described long ago as var. *lupinus*, Costa. In the lower lying (hotter) districts of Central Asia and Asia Minor as well as in S. Russia (according to Alpheraki) an intermediate form occurs which I call *intermedia*. Specimens are much larger than typical German *lycaon* and almost as densely hairy as the still larger *lupinus*, but darker and mostly with a broader (shorter) androconial stripe (or rather patch) on the forewing. Also on the underside of the hindwing they are almost always much lighter (more greyish-white) than *lycaon*, especially examples from Samarkand, almost like typical *lupinus*. I have this var. *intermedia* from Samarkand, Margelan; also one specimen each from Saison and Lepsa (presumably taken in other hotter districts) I must include with them. In the same way examples from Amaria and Achal Tekka District would be best included here, although the Amaria specimens are darker on the underside.

From this typical Staudinger description it at least appears that true *intermedia* is the Samarkhand, Margelan race. Hence Turati's *margelanica* must fall as an absolute synonym of *intermedia*. In Mesopotamia, Kurdistan and Western Persia occurs a race somewhat similar to *intermedia* but characterised by its smaller size, greyer appearance (the females particularly being very dark above, with very little orange as a rule) and the greater uniformity of the markings of the underside of the hindwing, the banded appearance of *intermedia* being absent or almost so, in the majority

of specimens. This may be known as *centralis*. (Types: B. M. Types No. Rh. 169 ♂, 6-5-19; 170 ♀, 7-5-19, Kizil-Robat, L. bank of R. Dyala, H. D. Peile). Somewhat similar, but characterised by very much darker underside to the hindwing, larger size, longer and yellower hair-scales occupying a more extensive area, is the Asia Minor race (*captus*, B. M. Types No. Rh. 171, ♂, 1-7-18; 172, ♀, 24-6-18, Kedos N. V. L. Rybot). This race is very intermediate between *lupinus* and *centralis* in all respects. It is also in the B. M. from Brussa, Kilishlar, Gulek and Yazgat and, according to Staudinger, occurs at Amasia. Finally the race from Cyprus may be mentioned. It represents the extreme in depth of colouration in both sexes above and below, with the only exception of the male of *mauritanica*, Oberth., which is blacker above. The female has, by comparison, an almost sooty appearance above and the yellow markings are of a very deep shade (*cypriaca*, B. M. Types No. Rh. 173, ♂, 24-5-09; 174, ♀, 9-5-09, Nicosia, Cyprus, J. A. Bucknill)."

Buxton records "*lupinus*, Costa, ♂ 6th September 1919, ♀ 18th July 1919, Qasvin, determined by genitalia, bad specimens."

E. jurtina, ssp. persica, LeCerf.

3 ♂, 14 ♀, from Harir and Karind where it is far less common than *E. lupinus centralis* in company with which it is found there.

Capt. Riley notes:—"All agree with LeCerf's description and figures. A tendency to reduplicate the apical ocellus of forewing is rather marked."

E. telmessia kurdistana, Ruhl.

Three females from Suleimenyeh, Kurdistan, 31st August and 1st September 1919, taken among bushes on the bank of the Kalisan river.

Smaller than *palescens*, the female above darker purplish grey, forewing with the fulvous area small and turning into a light yellow ring above eye-spot. Underside hindwing more uniform light grey, striated with darker, and without the well marked broad pale postmedian band of *palescens*.

E. telmessia palescens, Butler.

N. W. Persia: Karind Gorge, 13th July 1918, 2 ♀; Paitak, 6th August 1918, 1 ♀; Harir, 10th August 1918, 1 ♀.

Capt. Riley notes:—"LeCerf appears to have overlooked Butler's description of *E. palescens*, as his *areas* seems to be identical with it. *Palescens* was described from Dizful in N. W. Arabistan."

In this race the fulvous discal band also extends towards the base, and the hindwing beneath have a purplish grey basal half and a broad postmedian almost whitish grey band, and with some yellow markings or suffusion on its inner side.

E. mandane, Koll.

2 ♂, 24 ♀, Hari, 15th July to 16th August 1918.

Can be told at a glance by the long blind eye-spot at apex of forewing It has underside similar to *davendra*, but the white central line of hindwing is curved gently, not angled at all. (*Wagneri*, the race from N. Kurdistan, has ground-colour deeper, and the apical spot on forewing shorter.)

Capt. Riley notes regarding the above specimens:—"Typical *mandane* as described by Kollar from Farsistan, S. W. Persia. 8 ♀, have an additional blind ocellus on forewing in area 2 on upperside, and one of these has a furthur supplementary one in area 6."

Common about stony ground and at flowering mint by water at 5,300 to 6,000 ft. in the Karind Valley, N. W. Persia. Among stones in the open it is rather wary, but when settled at mint is easily caught. Taken from mid July to mid September 1918. There being only 2 males to 24 females taken seems to indicate that the season was rather late for this species.

Limenitis rivularis, Scop. (=**camilla,** Auctt.; **drusilla.**)

Of 9 ♂, 8 ♀ examined, taken in the Karind Valley 5,300-6,000 ft. from 13th July to 12th August 1918. Capt. Riley notes:—"LeCerf only gives var. *reducta,* Stgr. from Persia. These specimens are by no means referable to that form, which is represented in the B. M. by 2 ♂, from Hadschyabad (Haberhauer), 1 ♂, "Caucasus" (Lederer) and 1 ♂ Derband (Christoph). They are not separable from the European form unless perhaps by an average reduction of the red markings of the underside."

In perfect condition in mid July; common in August, and fond of settling on projecting boughs about eight feet from the ground, in a glade, now and again sailing about between the trees and often returning to the leaf it had left. Many settled on stones by a spring on August 12th at Karind Gorge. One taken 9th September at flowering mint, and one seen 19th September 1918. Taken also by Capt. Aldworth at Suwarra, Kurdistan, July 1919.

GENUS ARGYNNIS, Fab.

A. maia, Cr. (=**pandora,** Schiff.)

Seitz. 1·71c. **(pandora.)**

This very handsome fritillary is common in the Karind Valley and at Kermanshah in Persia. At 6,000 ft. in a beautiful gorge said by some to be the garden of Omar Khayyam, numbers were, in July 1918, sailing about the walnut-trees and, with the "Jersey Tiger" moth (*Callimorpha quadripunctata* =*hera*) greatly enhanced the beauty of its surroundings. Very common in mid-July, it was rather less so in August, and a few only were seen there on 19th September.

Both sexes are fond of resting suspended with closed wings on the underside of walnut-leaves on the sunny side of the trees. As one strolled beneath the trees they sailed away to sport with others, three and four together in a glade or about the cascades in the gorge below. Within an hour twenty in fresh condition were taken settled on the underside of leaves. They settled also among the pale green young foliage of apricot trees, and at thistles. Pairs were seen mated in mid-July. Males were observed at thistles on the open hillside at Kermanshah at the end of August, and Major Broughton, who also took it there, found it common in September 1918, in gardens flying round willows and fruit-trees. When settled on the underside of leaves of walnut and apricot, with the sunshine coming through the leaves they were very inconspicuous, only the green and silver being visible, particularly with the wings seen edge-ways from below. A large wild *viola* grew in the glades in the gorge, but no fritillaries were seen about these plants.

Localities.—N. Persia, Karind Valley 5,300-6,000 feet; Kermanshah. Occurs in South Europe and Asia Minor. According to Kirby the larva feeds on the wild heartsease.

The habits of this species in Macedonia are mentioned by Mr. H. Mace in the Entomologist, Vol. LIII, p. 64.

A. latona, L. (=**lathonia**, Auctt.)

Buxton notes having taken it at Menzil, 2,000 ft., 30th March 1919. common but worn.

GENUS MELITÆA, Fab.

M. trivia, Schiff., Sub-sp. **persea**, Koll. Seitz. 1, 66d.

In the Brit. Mus. and by Lt.-Col. W. H. Evans, this form is classed under *trivia*, Schiff., but Lt.-Col. Bingham (F. Br. Ind. Butt. Vol. 1, p. 453), described it as a race of *didyma*, Esper. *trivia* and *didyma*, like all forms of *Melitea*, vary greatly and are both widespread.

KEY: Bright tawny with scalloped black marginal band and small black spots above.

Underside apex of f.w. cream dotted with black, hindwing cream-white with broken curved bands of tawny and small black spots, the terminations of veins prominently black. Female, larger than male and hindwing beneath more cream tinted.

Usually rather scarce where it is found, though in March rarely one may secure a dozen in a morning. The dry-season or June-July brood is apt to be scarcer in collections than the other owing to the excessive heat, the forbidding region where it occurs preventing much collecting. For these little butterflies seem to delight in the hottest sunshine, with a temperature even in the shade of 120° F.; and the males being very small are particularly difficult to follow with the eye in the glare and with perspiration streaming over one's eyelids. Indeed with a prospect of getting possibly a few little *Melitea*, or very likely none, for one's trouble, the collector needs to be an enthusiast to go out into the heat and glare on these stony hills in June or July. These butterflies must no doubt find dew or flowers of some sort on these seemingly bare hills where they can renew the moisture of their small bodies in this awful heat, where almost their only companions seem to be the large spiny-tailed lizards (*Uromastix loricatus*).

The habits of *Persea* here are like those of the race on the N. W. Frontier of India on the Jebels or low hills at 400 to 600 feet elevation in Mespotamia, the males settle on the stony ground at the crests of the ridges, now and again rising to sport with some passing butterfly, and again settling with wings spread to the sunshine.

Usually when put up they soon settle again near the same spot. Being small they are not very easily seen when settled; so on coming up to a hill-crest it is best to watch the sky-line when a *Melitea* may be seen to rise up to meet some rival and settle again on the ground, where the net with tail and held up may be dropped over it. If the end of the net is not held up the butterfly is apt to damage its wings against the stones. Females are much the rarer and may be met with unexpectedly: perhaps settled on the ground near a camp, or at a flower. Freshly emerged examples were taken on 16th March 1919; on 21st May worn specimens only were taken. The previous year some in fresh condition were taken on 27th June.

An autumn brood, such as occurs on the N. W. F. of India, is probable also in Mesopotamia. Females were seen flying along the sides of stony ridges without settling, while the males kept often settling, about the crests both in Mesopotamia and on the North West Frontier of India, where too a mated pair were taken settled on the ground of the summit with a second male hovering about them. So these stony hill-crests would appear to be their mating places, the males waiting there to waylay the females as they come by. Lt.-Col. Watney took this Sp. at Baghdad far from any hills on April 19th, 1919. A pale form *var robertsi*, Butt., also occurs on the N. W. F. of India.

Localities :—Jebel, Kizil Robat, on Dyala, 16th March to 9th April, 21st May 1919. Jebel Hamrin, Dyala, 27th June 1918. At Fathah on Tigris, 11th April, 19th June 1920. Baghdad, 19th April 1919.

N. W. Persia; Karind valley. August 1918, occurs also on N. W. Frontier of India and Afghanistan.

Spring Brood.—Kizil Robat, 16th March to 3rd April, 32 ♂, 3 ♀; Fathah, 11th April.

Summer Brood.—Fathah, right bank of Tigris, 17th June 1920; Jebel Hamrin, bank of Dyala, 27-28th June 1918.

Capt. Riley notes :—"The summer brood is constantly smaller, much lighter and sandier, the black markings very much reduced in size and depth, above and below."

M. didyma, casta, Koll.

Harir, 9th August 1918, 1 ♂ ; 12th August 1918, 1 ♀.

Capt. Riley's note continues :—"Taking Kollar's descriptions of *casta* and *persea* in conjunction it appears very obvious, especially as he also records *M. phœbe*, that one must refer to the Persian race of *didyma*, the other to that of *trivia*. And, from an examination of the series of both species from Mesopotamia and Persia in the B. M., I am convinced that, contrary to the general usage, *persea* represents the race of *trivia* and *casta* that of *didyma*.

I give below a translation of Kollar's description (Deustch. Akad. Wissen. Wien, I, p. 50, 1850). A character I have found of use in separating these two species is the position of the black marks in areas 2 and 3 of the hindwing underside, between the orange bands. These markings are generally, in each area, three in number, and in *trivia* the middle one is nearer the distal one ; in *didyma* nearer the proximal one."

Kollar Deut. K. K. Akad. Wissen Wien, I, p. 50, 1850.

Melitæa casta.—Wings above fulvous, the costal strigæ of forewings and a broad submarginal fascia common to both wings and the margin itself black ; hindwings pale yellowish, with two very pale fulvous bands, the broad stripes and the series of black marginal spots less distinct. Exp. 15‴-17‴.

Next to *M. didyma*, from which, however, it differs most in that the wings above have fewer black bands and spots, and that the bands of the underside of the hindwing have almost disappeared.

Melitæa persea.—Wing above fulvous ; forewings with three black macular bands, hindwings with two ; below, the apex of the former and the whole of the latter pale yellow ; the macular bands of the forewings (below) conforming with those of upper surface, the hindwings with two pale fulvous bands and black lunules and spots. Exp. alar. 17.‴

Similar to the preceding but the markings of hindwings on the underside, which is *casta* in very similar to *didyma* ; in this manifestly differs and comes closer to *M. didyma* (sic !, ? some other species intended) from which, however, it ought to be separated owing to the failure of the black spots especially at the bases of the wings.

persea must be *trivia*, ssp.
costa ,, ,, *didyma*, ssp.

GENUS JUNONIA (Precis).

J. orithya, L., Seitz. 1.62b. ssp. **here,** Lang.

KEY : Bases black, outwardly broad bright blue, with a white apical bar on the forewing. There are two red ocelli on each wing near the margin.

Common near Basra and Shaiba ; scarce at Kut (Major Broughton, R.E.).

Baghdad, October, several taken; Babylon, January; Amara, May; Baiji near Fathah, in June; Khanikin, October.

Buxton took this at Amara in May, July, September, October and November.

Baghdad, 31st October 1920—5th November 1920, 1 ♂, 6 ♀.

Key to the forms of Pyrameis, &c.

A. Upp. f.w. apex black with white spots.
  a. Vermilion band across both wings. .. .. ..*P. atalanta.*
  b. Upperside hindwing, terminal half sallow yellow ..*P. cardui.*
B. A conspicuous small white L. shaped mark on underside of hindwing .. ..*Polygonia egea.*
C. A large conspicuous white C. on U. h. w. .. .. ..*P. c-album.*

GENUS PERAMEIS, Hb.

P. atalanta, L., Seitz. 1. 62c.

The "Red Admiral."

Black velvety ground with transverse bands of dark vermilion on f.w. and on hindwing an outer marginal band of same enclosing four black spots. Apex of f.w. velvety black with one large white spot and five smaller ones. H. w. with a small double blue spot at tornus. Underside of f.w. as above, but bands pale, parallel and followed by some bluish markings. The apex stone-coloured; of h.w. richly marked with dark and light brown, bluish and stone colour.

A few taken at Kizil Robat on the Dyala in November 1918 at mint flowers and hibernated specimens in March. Mosul "3 or 4, all a very small variety" (Capt. Aldworth).

Localities:—Mesopotamia—Kizil Robat, Mosul. Throughout Europe, N. Africa, W. Asia, N. America, Hamarin Isles. As with other migratory butterflies, it varies little geographically.

P. cardui, Lin., Seitz. 1. 62d.

Larva. Blackish brown, with a longitudinal pale interrupted line on each side. The segments armed, with short branched spines. Feeds on thistles and *Artemisia.* Pupa "tuberculate: head bluntly cleft, pale ochraceous or brown, more or less spotted with yellow."

Abundant in Mesopotamia, especially in April. Basra abundant, Sheik Saad, common in April 1917, disappearing during hot weather (Major T. D. Broughton, R.E.). Amara, May 1918. Kizil Robat on R. Dyala 1919. January 20th and Feb. 19th common; March 6th in thousands at flowers, rather worn; April 4th a fresh brood appearing: 10th abundant, many flying West: 19th abundant both battered old ones and a handsome bright new brood; May 10th larva found on leaf of small thistle, pupated, imago emerged May 22nd Khanikin, Sept.-Oct., both old and new broods. Baiji on right bank of Tigris, common in worn states in March 1920; fresh bright ones later.

S. Kurdistan. Suleimanyeh, Sept. 1st. Jujar Nov. 22nd, a few seen.

This butterfly is widespread about the world.

GENUS POLYGONIA.

P. egea, Cr. Seitz., Vol. I., p. 1, 64 c.

Pale golden fulvous white marginal row of yellow spots above. Small white L shaped mark on underside of hindwing.

f. egea.

5 ♂, Karind Gorge, 13-17th July, 12th August 1918.
1 ♀, Mosul, 24th April 1919 (ex. Aldworth).
Taken on walls and rock facing the sun, about 4 p.m.

f. J. album.

2 ♂, Karind Gorge, 14-17th July 1918.
Capt. Riley remarks on these as follows:—
"The two forms are very distinct. It will be noticed that on 17th July 1918 both forms were caught flying together."

It may be of interest here to publish a note on the Central Asiatic forms of this genus which was made by M. Andre Avinoff whilst on a visit to the (British) museum shortly before the war. He says: "*Polygonia egea* (*triangulum*) is found in Europe; in the South, from Caucasus it begins to get darker and generally runs into the form of Central Asia. It is not the *interposita* of Staudinger, as the *interposita* is the *C. album* form with *some* character of *egea* (I saw the type and studied the form by the Turkistan material). Grum-Grshmailo gave the name *undina* (Rom. Mem. IV., p. 424) to the *egea* of Turkistan but he was not quite right on the distribution (all he says about Osh and Margelan). In reality *undina* goes to Chitral by Bokhara and flies together with *interposita*. The series of the British Museum contain both species (*egea* does not go on the South), *interposita* is darker in Chitral, Goorais, Thundiani (*cognata*) and brighter and less dark in the South Himalaya (Nepal, Sikkim to Ta-tsien-lu) (where it is) the *agnicula* (=*tibetana*, Elwes). The *interposita* is very near to *C. album*, but it may be a distinct species." A. Avinoff.

From this and the series in the B. M., and in fact from Staudinger's original description* it is evident that *interposita* has nothing to do with *egea* but is a good species or the central asiatic race of *C. album*. What has generally been known as *interposita* must in future go by the name *undina*, Gr. Gr.

"Vanessa (Grapta) *C. album* var. *interposita*, Stgr. Four specimens received from Ala Tan necessitate my setting up a var. *interposita*, to which I now add also the specimen from the Saison District and one from the Altai District (Ustkamenogorsk). The specimens have above as dark an outer marginal area as the North American form *faunus*, which name Strecker simply places as a synonym of *L. album*, which name, however, in spite of the presence of intermediates, might very well be maintained for this nearctic form. The underside of this central asiatic var. *interposita* resembles more the ab. (var.?) *J. album* of *egea*, Cr. with the dark underside for which I at first took it. The C-mark especially is never so completely round or large as always in typical *C. album*, but forms a somewhat blunt angle as in *egea* or even only streak slightly bent below. Certainly this (mark) also varies in *C. album* and in all other Grapta species. In the North American *faunus* it is almost as bent as in *C. album*. *Egea* ab. *J. album* is however on the underside much more longitudinally streaked and above has never such a dark outer margin as has *interposita*. The *C. album* which are dark below are mostly brighter and in particular are without the brighter outer margin such as *interposita* shows. On this account these cannot either be referred to var. *faunus* all of which have a broader outer margin above, especially to the hindwing. Since examples from Kashmir and India also have this, and also in the males the very round C-mark (the females have mostly only a dash) I refer them rather to *faunus* than to *interposita*. Two males from Margelan are very peculiar one of them agrees completely with *interposita*, the other is above almost exactly as light as *egea* ab. *J. album*. Also below it (the latter) agrees almost completely with it in all respects and also the other specimen is just as much longitudinally streaked; the C-mark is reduced to a dash. These two examples belong more to *egea* than to *C. album*; but I refer them both to *interpostia*. Unfortunately I have no *C. album* from Amur or Japan before me."

* *Staudinger. Stell. Ent. Zell. 1881. p. 286.*

My own impression is that it is a good species. It is very much like *agnicula*, Moore, but has hind margin of the hindwing very broadly black, enclosing, usually, five very small pale spots—in *agnicula* these pale spots form a band—and the underside is somewhat, especially in the female, reminiscent of *egea*. The fact that with it in various parts of Kashmir *cognata* flies at the same time, and that *cognata* is pretty obviously a race of *C. album*, tends to support this view. Intergrades to *agnicula* occur, but not to *cognata*. The position in the Himalayas seems to be that there are three species, *viz.* :—

1. *P. egea undina*, Gr. Gr. Chitral, Hunza.
2. *P. C. album cognata*, Moore, Thundiani; Kulu; Nandar; Simla; Champur.
3. *P. interposita interposita*, Stgr. Chitral; Ladakh; Kylang; Kulu; Gervais; Pungi Dugi; Goolmerg; Gurwhal.

P. interposita agnicula, Moore, (=*tibetana* Elwes) Nepal; Sikkim; Tibet to Ta-sien-lu and Washan.

It may be well here to correct an error in Seitz. Macrolep, I., p. 208 with regard to the Japanese forms:—

Fentoni is not a synonym of *hamigera*. It is the older name for the form with the light brown underside; *hamigera* being based on a specimen of the form with slightly narrower forewings and more melanic upperside, an extreme of the form in fact".

P. C. album, L. f. hutchisonni, Robson.

1 ♀, Karind Gorge, 12th August 1918.

GENUS LIBYTHEA.

L. celtis, Esp.

1 ♀, Karind Gorge, 16th July 1918, taken at small tree; another seen.

Underside coloration of hindwing more uniformly grey than in European specimens; more like some Chitral specimens.

PAPILIONIDÆ.

GENUS 1—PAPILIO.

KEY. *a.* Hindwing.—No central dark band; a post-discal broad black band dusted with blue. Large terra-cotta-red and blue tornal spot. Ground colour bright yellow. *machaon.*

b. Hindwing.—Two black bands traversing hindwing centrally. Ground colour yellowish white. *podalirius.*

P. machaon, L., ssp. **centralis,** Stgr.

19 ♂, 22 ♀ examined.

Capt. Riley notes:—"A variable series, but not separable from *centralis*, Stgr. On the whole the specimens are very pale in colour, more especially the bred specimens."

Expanse.—3·7 inches.

machaon in Mesopotamia averages larger than type and than the race from Mussoorie in the Western Himalayas, though perhaps not so large as some found in Sikkim.

Mesopotamia provides at least five food plants of *machaon*, three of them in great abundance, so that, with the vast extent of swamp in places somewhat like the Norfolk broads, and of plateaux, it is found commonly from near sea level by the rivers, to the highlands across the northern border. In early spring it is fond of cruising around the crests of stony hills or "jebels" and of settling at flowers or on the ground there. But it is most plentiful in May, about the banks and beds of the rivers and on the neighbouring plateaux where its food-plants abound. In April and May a low growing deep-yellow flowered rue is common on the table land at about 400 ft. elevation, the plant consisting mostly of the flower-sprays which grow to about a foot in height, each plant separately, but in groups forming yellow patches on the plateau. This plant was identified at Kew as *Ruta tuberculata*, Linne. The whole plant has an unpleasant smell, and, when picked or handled, leaves as intensely bitter substance on the fingers. It occurs less plentifully on the banks of the rivers. Larvæ were most easily to be found by searching plants growing at the margin of old trenches. They were conspicuous and, as with all *Papilio* larvæ, extruded the orange-coloured osmeterium emitting a strong 'Tom-cat' like odour when disturbed. The larvæ fed on the flowers. As this plant began to go to seed, an umbellifer, *Ammi majus*, Linne, came into flower; and on this eggs were laid by *machaon* singly on flower buds at the margin of young flower-clusters. This plant was common about moist patches and in hollows; and when young, is very slender, so that one saw a *machaon* repeatedly hovering about what at first appeared to be a grass-stem but on closer inspection proved to be an umbellifer. As this plant began to go to seed, another—identified at Kew as *Ducrosia anethifolia*, D. C.—which seemed to be local and not common, came into flower on the banks of the Dyala; the leaves being rather stiff and a little like split miniature palm-leaves. The whole plant is a yellowish green, flowers paler, and all parts having an aromatic parsley or carrotlike smell. It grows in clumps and singly about conglomerate rock.

Two larvæ only were found on this, both having remarkably white bands instead of yellowish or green ones, so that they were very conspicuous. While *A. majus* and this last mentioned plant were going over, a fourth food-plant, *Ammi visnaga*, Lam., had grown up among the first, especially in moist hollows on the banks and in the bed of the rivers and old canals. It is thick stemmed, very erect, leaves made up of long filamentous branchings, the whole plant except the flowers being conspicuously deep green with compact umbrella like clusters of white flowers set more closely and uniformly together than those of *A. majus*; the pedicels being evenly arranged like numerous wires from the stem or stick of the umbrella.

This plant continued in abundance and conspicuously green when in the middle of June *A. majus* and others had mostly withered to dry sticks. The larvæ fed on the flowers of all these food plants and scarcely ever on the leaves though Lt.-Col. W. H. Evans informs me that at Murree he has bred *machaon* "on fennel-leaves not flowers."

Three of these food-plants grow in great abundance by the Dyala at about 400 feet elevation, where 34 larvæ almost full grown were easily obtained on *Ruta tuberculata* within an hour. The extensive grass-fires which occur on these plateaux in the hot months must destroy vast numbers of eggs, larvæ and pupæ of butterflies and moths.

A fifth food-plant an umbellifer, *Fœniculum vulgare*, Gærta, was noted on May 2nd, 1920, at Baiji, having with its clusters of orange yellow flowers some general resemblance to rue. On some of these, near which a bleached *machaon* was seen, eggs of machaon were found laid singly, some on the lower and outer-side of the pedicels of the flowers; some about the middle, others close up below the florets, and one on a filament of a leaf arising by a flower-cluster. The eggs were semi-opaque pale green and mostly with a broad reddish brown

band; spherical in shape, except where attached, and the surface seen under the microscope was only slightly rough. On 7th May a spiny black larva, with dull white medial patch and black head, hatched probably the previous day from one of the same batch of eggs was found on a floret of this plant. Moulted 10th May, becoming greenish white spotted with black with some lateral orange spots and slight spines, which were black except on segments 7 and 8, which still remained white. At this stage the larva was much less orange than those found at Kizil Robat the previous year.

On 12th May it again cast its skin becoming greenish white, banded transversely on each segment with orange and black spots, and with black intersegmental bands. It eventually reached full size being greenish white with transverse black band and orange spots. Towards the end it fed on the young seeds; on 19th May when wandering to pupate it fell into some water where it was found motionless and limp, apparently dead; but after being placed in the sun for about an hour it slowly revived, and pupated on 21st May, becoming a pale stone-brown pupa, but it died in this stage.

A pair were observed in copula on May 31st, one bright yellow, the other much paler and slightly smaller; the former was doing the flying. On the same date females were seen ovipositing, some on *A. majus* and others on *A. visnaga*, the two being in flower at the same spot. The egg, nearly round and like a shining semi-opaque pale-green bead, was laid at the base of a floret or on the leaflet by the side of a floret. The eggs were remarkably easily detached accidentally, as on handling the plant. On the same date, May 31st, eggs and larvæ in almost all stages were found on both *Ammi majus* and *A. visnaga*; and one larva on a spray of *Ruta tuberculata* growing there and still in flower.

The larvæ on the yellow-flowered rue had yellowish-green bands; the two on *D. anethifolia* had pure white bands as before mentioned and a few found on *A. majus* and *A. visnaga* on 31st May had very pale, nearly white, bands on each segment.

At Kizil Robat the very young larva was orange brown with a white portion medially. In early stages it has spine-like tubercles, which disappear later; and about the third moult the white median portion gives place to the orange-spotted black bands on the ground-colour as in other segments. The orange spots on these bands are of vivid colour.

When very small the larvæ lie along the stems of the pedicels of florets when at rest, but at all stages are fairly easily seen.

Larvæ were easily reared on sprays of *R. tuberculata* placed in bottles, the sprays and water being renewed twice daily. The escape of a few restless larvæ about to pupate warned one to put the larger larvæ together on sprays in one bottle with an old butterfly net placed over the sprays and larvæ and tied around the neck of the bottle; then any larvæ showing signs of diarrhœa or wandering could be detected and transferred each to an inverted glass tumbler in which a stem had been placed slantways; and on this the larvæ usually readily pupated, at first resting head upwards then turning head down while making the tail-pad of silk and again turning head upwards to make the body-girdle and to complete pupation, the larval skin being very rapidly thrown off after the moment of the first split in it being made. The pupating larva having made its silk pad and girdle, the stem to which it was attached was then removed from the tumbler and placed with others around a cork in a bottle to await the emergence of the butterfly in from ten to fifteen days time in the warm weather of May.

Pupæ varied in colour from grass-green studded with bright yellow tubercles of exactly the same shade as the flower-buds of the rue, these mostly producing females, to stone colour and some darkly marked brown, males generally emerging from these last.

Of four larvæ which temporarily escaped, one became a dust-coloured pupa on the rope lacing of the tent; a second turned to a green pupa at the side of

the back of a camp chair, matching exactly the colour of the Willesden-canvas to which it was attached. A day or so before the writer had noticed on leaning back in the chair the strong smell usually emitted by a *machaon* larva on being disturbed, but, on looking for it, did not see it then; a third pupated on a wooden box, here again matching the colour of the wood; while the fourth, on the camp-bed being set up again, after having been folded up in its case and moved with other kit on a cart from the last camp, was found attached undamaged to the iron cross-piece of the bed.

Circumstances prevented the completion of experiments with *A. majus* and *A. visnaga*, and the larvæ on these had to be liberated. The emergence from the pupa and wonderful, rapid, expansion of its wings was an ever-fascinating process to watch. It took place often about 5 a.m. (in June) and emergence was so rapid that one rarely witnessed the formation of the first crack in the pupa-case.

A small black parasitic fly infests this species, scores of its pupæ being found in each of several pupæ found in the open attached to plants, whereas very few pupæ reared from larvæ taken nearly fully grown were thus infested. One pupa was found on the stem of *A. majus* about three feet above the ground; another on the stem of a yellow composite flower scented like lavender. To capture the free butterfly the net should be dropped over it as it is settled or hovering, the tail of the net being held up, as a side sweep is very apt to damage the wings or tails, especially among the sharp-spined yellow thistles so attractive to butterflies. Like all swallow-tails it is very apt to damage itself in the net if not quickly killed.

machaon was often to be found in the spring at the top of stony hill-crests and, when first put up, usually cruised around for a bit but settled eventually at a flower or on the bare ground in the sunshine at the highest spot, to be secured by dropping the net over it after a cautious approach. As mentioned before, it is often found associated with *Melitœa didyma* and a *Synchlœ belemia* or *Euchlœ* on the hill tops—*Melitœa* settled on the ground and *Synchlœ* merely hurrying past. In May it is remarkably common on the banks of the Dyala and many may be taken in a short time especially between 9 and 10 in the morning. But the best specimens are of course obtained by rearing from the larvæ, the largest larvæ being taken to ensure early pupation. On the banks of the Dyala at the end of May many of these butterflies are worn and bleached.

Localities:—Kut-el-Amara: Kotamiyeh forest near Azizieh (Major Broughton); Baghdad and Mosul (Lt.-Col. Watney); Kizil Robat by the Dyala, Baiji and up to 6,000 feet at Karind in N. W. Persia.

The following notes regarding larvæ and periods of pupal stage may be of interest. Many more larvæ pupated and emergence duly took place, but date of pupation was not always noted.

Larvæ were common on April 15th, and one was found on June 23rd.

The dates of pupation and emergence were noted in the following instances:—

Pupated.	*Emerged.*	*Period in days.*	*Sex.*
April 18	April 28	10	♂
„ 21	May 1	10	♀
„ 22	„ 2	10	♂
„ 23	„ 5	12	♀
„ 23	„ 5	12	♂
„ 24	„ 6	12	♀
„ 24	„ 8	14	♂
„ 25	„ 9	14	♀
„ 27	„ 10	13	♀
May 22	„ 31	9	♀
„ 22	June 1	10	♂
„ 27	„ 6	10	♀

P. podalirius, L. Seitz. Vol. 1·7 c.

Much paler yellow than *machaon.* 2 black bands from costa to dorsum of forewing. 1 black band trave sing hindwing centrally to anal eyespot: tail long and straight continuation of hindwing.

Two specimens of this were taken by Capt. Aldworth and Capt. Marshall at 5,000 ft. at Suwarra above Mosul in the first half of July.

The fact that oak, plum and other fruit-trees are food-plants of this butterfly explain its being found in the hills and not on the plain.

The larva is thick, narrowed posteriorly, green with many dark spots and oblique yellow lateral lines.

P. alexanor, E. Seitz. Vol. 1.7a is likely to occur in the highlands. It has a continuous yellow marginal band on forewing, a distinct black elongated discoidal spot on hindwing and the antennæ tipped with yellow.

Kane says its food-plants are "Seseli montanum and other umbellifers."

GENUS 2.—THAIS, Hb.

T cerisyi, Bdv. Sub.-sp. **deyrollei,** Ol. Seitz. Vol. 1. 9d.

KEY: Hindwing, interrupted dentations along terminal margin, three on each h.w. lengthened into tails.

Antennæ short.

Upperside:—f. wing:—ground colour very pale yellow with broad black patches along costa; dark shadings at apex and terminal margin.

Hindwing:—Interrupted dentation along terminal margin, and three on each wing lengthened into tails. A median series of small red spots and one larger costal one ringed with black.

Expanse:—just over 2 inches.

One, of large numbers seen migrating over open ground at Mosul at end of April or early May, was taken by Capt. T. Aldworth, and sent to the British Museum of Nat. History and there identified as this race of *T. cerisyi* "having 3 fairly well developed tails to each hindwing," one recorded also from Tekrit by Stoneham.

The larva is stout, dark, but varying much in colour, with numerous tubercles as in *machaon,* and 4 broad yellow longitudinal lines; food-plant *Aristolochia.*

GENUS 3.—DORITIS, Fabr.

D. apollinus, Herbst, Seitz. I·10c.

On the forewing rather densely pencilled transversely on a grey ground, the ♂ being occasionally marked with a little red; hindwing chalky white in fresh specimens, yellowish in worn ones, the dark border bearing reddish spots centred with blue. ♀ darker, stouter, pencilled also on the hindwing, here and there irrorated with red. Western and South Western districts of Asia Minor, transitional forms also in Syria and Mesopotamia.

Two specimens were sent to the Society, taken by Lieut.-Col. Watney about 25 miles N. E. of Mosul at 1,000 feet where they were fairly common in fields in April 1920.

(*To be continued.*)

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 30, 1921.]

MYRIAPODS FROM MESOPOTAMIA AND PERSIA,

COLLECTED BY MR. P. A. BUXTON

BY

H. W. BROLEMANN, PAU, FRANCE.

(*With two plates.*)

The material collected by Mr. P. A. Buxton, though limited to a few specimens, is far from being void of interest.

A new Lithobiid has had to be inscribed to the Persian fauna. The rediscovery of Humbert and Saussure's *Strongylosoma persicum* offered good opportunity for describing the sexual characters of the female, which were still unknown; such a type of vulva has not been observed before. The capture of a species of the genus *Polyxenus*, most likely to be *P. ponticus*, afforded the possibility of making up for the blanks of Lignau's diagnosis.

For the favor granted in enabling him to put on records such valuable specimens, the author wishes to express his sincerest thanks to Mr. Buxton.

MESOPOTAMIA.

PACHYMERIUM FERRUGINEUM (C. Koch, 1835).

Two female specimens with 55 pair of legs, from Amara; XII, 1917.

LITHOBIUS ? AERUGINOSUS L. Koch, 1862.

Length 10,50 mill.; breadth 1,30 mill.

Tergites 9, 11, and 13 with rounded angles. Antennæ 20-jointed. Ocelli 1+3 in a single irregular row. Coxosternal teeth of maxillipedes 2+2 and strong lateral spines.

Tarsi 1 to 13 single-jointed. Coxal pores: 2, 2, 2, 2. Spinal armature of legs

| | | |

Female unknown. A single male specimen from Amara; XII, 1917.

The palearctic members of the same group of *Lithobius* having rounded angles of tergites 9, 11 and 13, ocelli few disposed in rows, and the anal legs without coxolateral spine, without sexual structure and with a single claw, are: *crassipes* L. K., *æruginosus* L. K., *fallax* Mural., *ignotus* Mural., and (possibly ?) *argœnsis* Att. With none of them does the above specimen agree entirely, and nothing is known of the legs of *argœnsis*. Therefore, rather than create a new name for a single specimen, it is deemed wiser to ascribe it to the nearest related form, *L. æruginosus*, in spite of the difference noticed in the spinal armature of the hind legs.

STRONGYLOSOMA PERSICUM Humbert & Saussure, 1869.

The sterno-pleural suture is a curved ridge sharpened on the second segment and gradually rounded backwards; it disappears after the 10th segment. The dorsal furrow of the lateral keels is straight on the non-poriferous segments and sinuate on the others.

The vulvar aperture of the 3rd segment is very wide, rounded laterally; the posterior margin is almost straight and moderately erected. Sternum of the second pair of legs poorly developed, very low and not as wide as the lateral expansions of the coxæ. The posterior surface of the latter is hollowed at the base so as to cause the distal half to appear swollen.

Vulvar invaginations shallow, scarcely deep enough to conceal the vulvæ and hardly distinct from one another. When at rest the vulvæ have the operculum ([1]) turned upwards and the ridge outwards, the posterior end of the mound filling the aperture of the 3rd segment. Vulvæ (fig. 1 and 2) not much longer than deep. Operculum smaller than the mound, excised apically; the distal angles are produced and bear a particularly long and thick macrochæta pointing backwards. Mound with its posterior end abruptly truncate. Outer valve shorter and higher than the inner, the latter being much lower than long. The valves are not fused posteriorly but the upper angles are produced internally into hooks, the concavities of which face each other. Surface of the valves with few and rather short setæ; no macrochætæ. The appdema is sinuous, it shows no superficial ornaments (as seen in *Polydesmus*) and seems destitute of internal appendages. No trace of a shield could be noticed.

([1]) The description of vulvæ having so far been entirely neglected and no English terms having been applied to the different parts of these organs, it is proposed to use provisionally the following:—

operculum = (l'opercule) the smallest, plate-like part of the vulva, theoretically considered to be anterior;

mound =(la bourse) the largest and theoretically the posterior part, the anterior truncate surface of which is covered by the operculum;

valves =(les valves) inner and outer chitinized slopes of the mound bearing setæ and often macrochætæ;

ridge =(le cimier) apical space left between the valves, beginning immediately behind the anterior troncature and extending more or less backwards;

apodema =(l'apodème) gutter-shaped chitinous thickening extending longitudinally below the ridge and communicating with the latter by means of a

slit =(la fente de l'apodème);

diverticula =(les diverticules apodèmatiques) differently shaped appendages of the apodematic gutter, erroneously considered as glands by some authors;

The operculum articulates with the mound by means of

hinges =(les fourches);

shield =(le gorgerin) accessory posterior plate which is often missing and is eventually replaced by some expansion of the valves.

The French terms are those used by Brolemann and Lichtenstein, "Les vulves des Diplopodes," Arch. Zool. exper. gen., LVIII, 4, 1919.

MESOPOTAMIAN AND PERSIAN MYRIAPODS.

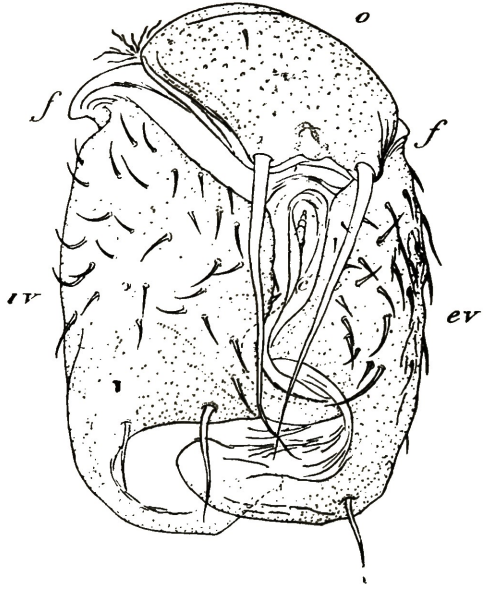

Fig. 1.

Fig. 2.

STRONGYLOSOMA PERSICUM, H. & S.

A sketch of the male gonapods (fig. 3) is added to show the development of the secondary ramus. Attems states that this ramus is formed of two laminæ, a fact which could not be ascertained.

Amara; XII, 1917; 2, I, 1918, "under fallen palm branches"; III, 1918.

PERSIA.

Pachymerium caucasicum Attems, 1903.

One male specimen with 47 pair of legs.

Resht; II, 1919.

Lithobius buxtoni, n. sp.

♂: length about 10 mill.

Colour drab. Head-plate with black margins and a black median spot. Main tergites with black lateral and posterior edges and a black dorso-median line. Mouth-pieces and ventral surface pale yellow. Anterior legs pale becoming gradually fuscate backwards and from the apex towards the base, the last legs being entirely dark coloured.

The cephalic plate as well as the anterior main tergites have their marginal pad entire; this is interrupted mesially on the 7th tergite only. Posterior margin of the 8th, 10th and 15th tergites scarcely or feebly emarginate; posterior margin of the 12th and 14th tergites decidedly excised, the posterior angles being acute and somewhat raised. Tergites 9, 11 and 13 with moderately produced, but sharp angles. Surface of all the tergites strongly rugose and showing oblique, irregular longitudinal furrows.

Ocelli few, 1+3, 2, 2. Antennæ long, 37–40 jointed.

Coxosternum of maxillipedes with the produced anterior margin armed with 2+2 small teeth; no lateral spines could be detected.

Coxal pores 3, 2, 2, 2, small, rounded.

Spine armature of legs of

1st pair	o. o. p. a p. a .		
	o. o o . am . m .		
2nd pair	o. o. mp. a p. a .		
	o. o. m . am . m .		
3rd pair	o. o. mp. a p. a p.		
	o. o. m . am . m .		
4th pair	o. o. mp. a p. a p.		
	o. o. m . am . m .		
5th to 11th pair	o. o. amp. a p. a p.	or	with an occasional p below the 4th joint on P. 10.
	o. o. m . am . am .		
12th pair	o. o. amp. a p. a p.		
	o. o. mp. am . am .		
13th pair	o. o. amp. a p. a p.		accidentally a dorsal m is found on the 4th joint.
	o. m. amp. am . am .		
14th pair	o. o. amp. a p. a p.		
	o. m. amp. am . m .		
15th pair	o. o. amp. p. o .	or	o. o. amp. o . o .
	o. m. amp. am . m .		o. m. amp. amp. m .

15th pair without coxolateral spine; claw double. No special sexual structure on 14th or 15th pair.

The female is unknown.

Resht; II, 1919.

This new species is to be distinguished from *L. melanops*, Newpt., apparently its nearest relative, by its rugose tergites and by the spinal armature of the legs. The only *Lithobius* so far recorded from Persia is *L. persicus* Pocock, 1899, from Seir. The possibility of identifying the above described specimen with Pocock's species is excluded considering that the latter has only the 13th dorsal plate angularly produced, that the anal leg is armed with O. 3. 3. 1 spines below, with a single apical claw and with a coxolateral spine, and that the legs of the two last pairs are sulcate above in the male.

CHORDEUMOIDEA, sp.

One female specimen from Resht; II, 1919.

IULOIDEA, sp.

One immature specimen from Resht; II, 1919.

POLYXENUS PONTICUS (Lignau, 1903) nob.

Length (without the anal bunch) 8, 50 to 9 mill. Breadth of the 7th segment (including pleuræ) about 0.95 mill.

In most of the morphological details the Persian specimens are identical with *P. lagurus* Latr. The sense cones of the palpi are single-jointed. Ocelli six. Sense calicles of the head disposed in a triangle as in the western species. Also the anal bunches are located alike.

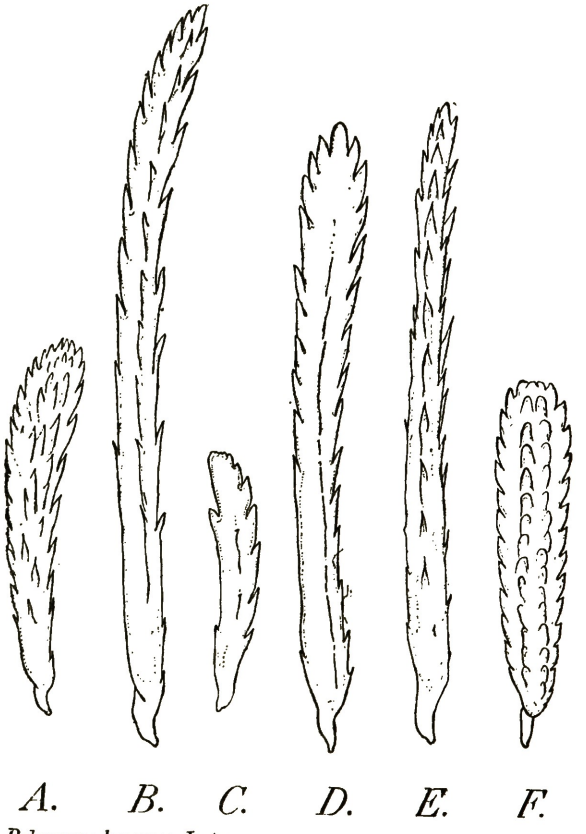

Fig 5.—*Polyxenus lagurus*, Latr.
A to E, setæ corresponding to those represented in fig. 4; F, not observed in *ponticus*.

MESOPOTAMIAN AND PERSIAN MYRIAPODS

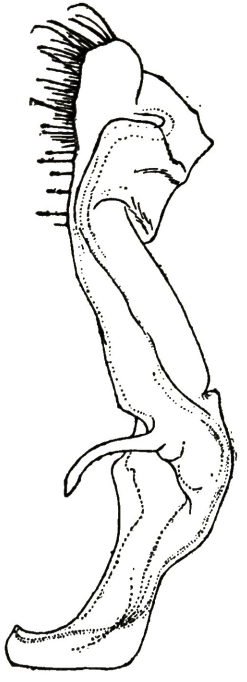

Fig. 3.
STRONGYLOSOMA PERSICUM H. & S.

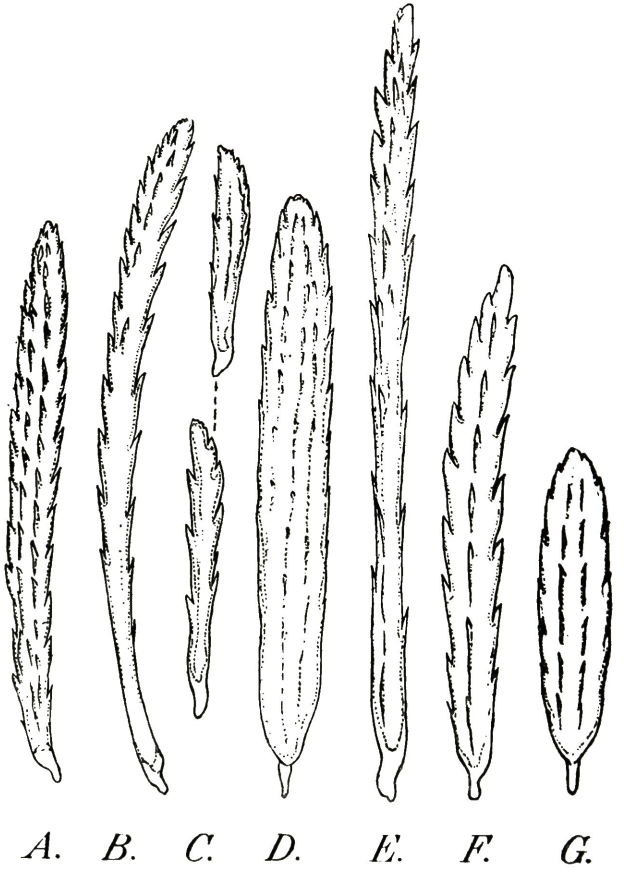

Fig. 4.
POLYXENUS PONTICUS (Lignau) nob.

Yet the setæ are differently shaped. Generally speaking they are more slender and longer in *ponticus* than in *lagurus*; fig. 4 and 5 show the differences in the corresponding setæ of the head (A and B), of the dorsal rows of the tergites (C and D) and of the pleural plumes (E). Quite striking are the setæ of the posterior marginal row of the tergites; these are blade-like, with parallel margins, and are neatly arranged side by side in a single line. The setæ of the anterior-marginal rows of the tergites are comparatively shorter and more numerous. The hooked trichomes of the anal bunches are much (almost one half) shorter than the central brush-like setæ; they show two to five apical lobes, as in *lagurus*; the five-lobed trichomes appear to be less numerous than the fewer-lobed ones, the contrary being witnessed in *lagurus*.

Enzeli (N. W. Persia); VI, 1919.

Whether this is Lignau's true *ponticus* has still to be ascertained. The Russian author (Die Myriopoden der Pontus-Küsten von Caucasus. Odessa, 1903, p. 131 of the German summary) only announces the description to appear in a later work and states that the new species is to be known from *lagurus* through the structure of the antennæ, the setæ of the anal bunch and other particulars (?). Although no difference could be detected in the antennæ (the proportions of which are similar to those indicated by Latzel), it may be assumed that the Persian specimens are specifically similar to those of the Caucasus considering the vicinity of the localities.

EXPLANATION OF PLATES.

Plate I.

Fig. 1.—*Strongylosoma persicum*, H. & S.
The left vulva from above. *o*=operculum ; F=hinges ; *ev*, *iv*=outer and inner valve ; *c*=ridge

Fig. 2—*Strongylosoma persicum*, H. & S.
The left vulva from without. Same lettering as fig. 1, plus : *ov* = oviduct.

Plate II.

Fig. 3—*Strongylosoma persicum*, H. & S.
Male copulatory leg.

Fig. 4—*Polyxenus ponticus* (Lign.) nob.
Differently shaped setæ : A and B, from the head ; C, from the anterior-marginal rows of the tergites ; D, from the posterior-marginal row of same ; E, from the pleural plumes ; F and G, from unascertained parts of the body and not observed in *lagurus*.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 30, 1921]

MOTHS OF MESOPOTAMIA AND N. W. PERSIA.

BY

VARIOUS AUTHORS.

Note.—Throughout this series of papers the following abbreviations are used for the collectors' names and initials :—

B. T.—Major R. Brewitt-Taylor, R.A.M.C. ; *P. A. B.*—Capt. P. A. Buxton, R.A.M.C.; *Br.*—Major T. D. Broughton, R.E.; *C.*—Lt.-Col. F. P. Connor: *W. E. E.*—Capt. W. E. Evans, R.A.M.C.; *L. H.*—Capt. L. Harrison; *H. D. P.*—Lt.-Col. H. D. Peile, I.M.S.

[The specimens taken by Col. Connor and Major Broughton are in the B. N. H. S. Museum. No map is published, because all the localities mentioned will be found on the maps which accompany Major R. E. Cheesman's paper on the Mammalia of Mesopotamia and Dr. P. A. Buxton's paper on the Birds of N. W. Persia]

PART I.

NOCTUIDÆ, LEMONIIDÆ AND PYRALIDÆ.

BY

LORD ROTHSCHILD, F.R.S.

I have been asked to contribute the portion dealing with the above 3 families to this list of Mesopotamian and Western Persian Lepidoptera. As in the other portions of the paper the captors' names are indicated by initials.

The nature of the lepidopterous fauna as indicated by the insects of the above 3 groups is decidedly Central Asian in character, though appertaining to the general desert fauna. As was to be expected, however, a few purely tropical forms are present. These are specially the 2 Noctuids *Erebus macrops*, Linn and *Hylodes caranea*, Guen. All the types except that of *Lemonia peilei* are in the Tring Museum.

NOCTUIDÆ.

Agrotinæ.

1. *Chloridea peltigera*, Schiff.

3, Mirjana, Dyala River, November, 1 Jebel Hamrin, June 1918, H. D. P.; 1 ♂, Amara, Mesopotamia, July 1916, B. T. : 1, Amara, May 1918, P. A. B.

2. *Chloridea nubigera*, Herr.—Sch.

1, Amara, Mesopotamia, November 1918, P. A. B.; 1, Mirjana, Dyala River, June 1918, H. D. P.

3. *Euxoa lata golickei*, Ersch.

1 ♂, Amara, Mesopotamia, November 1918, P. A. B.; 1 ♀, Mirjana, Dyala River, October 1918, H. D. P.

Sir George Hampson and many other writers have erroneously placed *lata*, Treits and *golickei*, Ersch, as varieties of *crassa*, Hbn., but the much longer and differently arranged pectinations of the antennæ of the two latter forms at once separate them from *crassa*. The 3 forms hitherto united under *crassa* must therefore stand as *Euxoa crassa*. Hbn.; *Euxoa lata lata*, Treibs. and *Euxoa lata golickei*, Ersch.

4. *Euxoa lasserrei*, Oberth.

1 ♂, Khaniqin, Mesopotamia, November 1918, P. A. B.

5. *Euxoa messaonda matritensis*, Vasq.

1 ♀, Baiji, River Tigris, November 1919, H. D. P.

6. *Euxoa segetum*, Schiff.

1 ♀, Mirjana, Mesopotamia, December 1918, H. D. P.

7. *Euxoa spinifera*, Hübn.

2 ♂♂, 1 ♀, Amara, Mesopotamia, May-August 1918, P. A. B.; 5—Amara, August 1916, B. T.; 1 ♀, Kut, April 1918, Br.

7*a*. *Euxoa cognita*, Shdgr.

1 ♀, Qazvin, September 1919, P. A. B.

7*b*. *Euxoa mustelina terminalis*, Subsp. nov.

♂ Distinguished from *m. mustelina* and *m. centralis* by the dark almost black subterminal area of the forewings.

Habitat.—Qazvin, September 1919, 1 ♂, P. A. B.

8. *Euxoa conspicua*, Hbn.

1 ♂, Enzeli, Caspian, N. W. Persia, June 1919, P. A. B.

9. *Agrotis ipsilon*, Hufn.

1, Amara, Mesopotamia, September 1916, B. T.; 1 ♂, Kut, May 1918, Br.

10. *Agrotis comes*, Hbn.

1 ♀, Enzeli, Caspian (Gilan), N. W. Persia, June 1919, P. A. B.

11. *Agrotis pronuba*, Linn.

3, Qizil Robat, Mesopotamia, March-April 1918, H. D. P.

12. *Lycophotia margaritosa*, Haw.

1 ♂, Resht, N. W. Persia, February 1919, P. A. B.

Hadeninæ.

13. *Discestra arenaria*, Hmpsn.

1 ♂, Amara, Mesopotamia, May 1918, P. A. B.

14. *Scotogramma tripolii*, Roth.

2. Amara, Mesopotamia, September 1916, B. T.

14*a*. *Scotogramma chimœra*, Rothsch. 1 ♀, Baghdad, October 1917. P. A. B. (2nd known specimen.)

15. *Cardepia taylori*, sp. nov.

♂, similar to *irrisor*, Ersch., but larger and darker.

Antennæ brown; head and thorax greyish wood brown, *not* pale mouse grey, abdomen wood grey, *not* buffish wood grey. Forewing dark brown grey, strongly variegated with blue-grey and cinnamon brown. Orbicular much larger than in *irrisor*, reniform more sharply defined and stained with black on lower portion, claviform very large and intense brown black; submarginal line much deeper dentate and angulate; fringe brown, not white, and with a row of large dark brown patches. Hindwing basal ⅔ less white, outer half sooty black; fringe white. Length of forewing 18mm. Expanse 41 mm. 1 ♂, Amara, Mesopotamia, October 1916, B. T.

16. *Sideridis vitellina*, Hübn.

1 ♀, Baku, Caspian, May 1919, P. A. B.

17. *Cirphis loreyi*, Dup.

1 ♂, 1 ♀, Amara, May-July 1918; 1 ♂, Kumait, River Tigris, November 1917, P. A. B.; Amara, May-August 1916, B. T.; 2 ♀♀, Kut, May 1918, Br. and B. N. H. S.

18. *Cirphis zeæ indistincta*, Christ.

1 ♀, Basra, August; 1 ♂, Amara, October 1918, P. A. B.; 2 Amara August 1916, B. T.

19. *Cirphis corrugata*, Hmpsn.

1 ♀, Amara, July 1918, P. A. B.; 1, Amara, July 1916, B. T.

Cucullianæ.

20. *Cucullia tanaceti*, Schiff. and Den.

1 ♀, Enzeli, Caspian, June 1919, P. A. B.

21. *Cleophana bœtica diluta*, Rothsch.

3 ♂, Mirjana, Dyala River, February 1919, H. D. P.

22. *Metopoceras omar caspica*, Alph.

1 ♂, Amara, April 1918, P. A. B.

Zenobiinæ (*Achronyctinæ*, Auct.)

23. *Cranioptora pontica*, Stdgr.
1 ♀, Qazvin 4,000 feet, July 1919, P. A. B.
24. *Prodenia litura*, Fabr.
2 ♂ ♂, Amara, November 1917 and June 1918; 1 ♂, Basra, August 1918, 1 ♀, Qurnah, May 1918, P. A. B.; 4, Basra, May-June ; 4, Amara, August 1916, B. T.
25. *Spodoptera abyssinia*, Guen.
1, Basra, May 16; Amara, June-September 1916. B. T.; 1 ♀ Basra, August 1918, P. A. B.
26. *Laphygma exigua*, Hübn.
1 ♂, 3 ♀ ♀, Amara, May-September ; 1 ♂, 2 ♀ ♀, Qurnah, May 1918, P. A. B.; 5, Amara, August 1916, B. T.
27. *Athetis clavipalpis*, Scop.
1 ♀ Kumait, November 1917, B. A. B.
28. *Athetis pertinax*, Stdgr.
1 ♂, Amara, April 1918, P. A. B.
29. *Catamecia buxtoni*, sp. nov.
♂ ♀ closely allied to *deceptrix*, Stdgr., but at once distinguished by the postmedian band of forewing being much less strongly and not so evenly curved, also this band is not so strongly nor so regularly dentate as in *deceptrix*. The black streak from the base of forewing is much stronger and more bent than in *deceptrix* and the reniform is larger and has on its basal side a large dark patch and a similar one is basal of the orbicular which patches are absent in *deceptrix* ; the subterminal band very sharp and angulated on and above vein 4. Hindwings white but not so pure as in *deceptrix* being irregularly tinged with grey.
Length of forewing: 19mm. Expanse: 42mm.
Habitat—2 ♂ ♂, 1 ♀, Ali ash Shargi, November 1917 (♂ Type), 1 ♂, 4 ♀ ♀, Kumait, November 1917, P. A. B.
30. *Catamecia minima bacheri*, Stdgr.
1 ♀, Amara, June 1918, P. A. B.

Erastrianæ.

31. *Eublemma parva*, Hübn.
1 ♂, 5 ♀ ♀, Amara, May—October 1918, P. A. B.
32. *Eublemma uniformis*, Stdgr.
3 ♀ ♀, 1 ♂, Qazvin, July 1919, P. A. B.
32*a*. *Erastria trabealis algira*, Oberth.
1, Amara, August 1916, B. T. (ab. *flavoniteus*, Aust.); 1 ♂, 6 ♀ ♀, Amara, April-September 1918; 1, Qazvin, July 1919, P. A. B. (2 ab. *deleta*, Stdgr.)
Among the 5 *t. algira* there is only one quite typical, the remaining 4 are intermediate between *t. algira* and typical *trabealis* in the amount of black on the forewings.
33. *Tarache lucida lugens*, Alph.
1 ♂, 1 ♀, Menjil, N. W. Persia, March 1919, P. A. B.; 1 ♂, Baghdad, November 1917, L. H. (B. N. H. S.); 7, Kizil Robat, February-May; 1, Baiji, river Tigris, November 1919, H. D. P.

Westermanniinæ, *Acontiæ*, Auct.

34. *Earias chlorophyllana*, Standgr.
2 ♀ ♀, Enzeli, Caspian, April 1919, P. A. B.
35. *Arcyophora dentula*, Led.
14, Amara, July-October 1916, B. T.

Catocalinæ.

35*a*. *Mormonia mesopotamica*, Kusn.
1, Karind, July 1, Kermanshah, August 1918, H. D. P.

36. *Mormonia neonympha*, Esp.
1, Basra, May 1916, B. T.; 1, Dyala River, June 1918; 4, Jebel Hamrin, June 1919, H. D. P.; 2 ♂ ♂, 1 ♀, Kut, May-June 1918, Br. (B. N. H. S.); 1 ♂, Qazvin, N. W. Persia, August 1919, P. A. B.

37. *Catocala elocata locata*, Stdgr.
1 ♂, Qazvin, N. W. Persia, July 1919. P. A. B.; 1, Jebel Hamrin, June 1918, H. D. P.; Kermanshah, August 1918, H. D. P.

38. *Catocala puerpera pallida*, Alph.
1 ♂, Kermanshah, September 1918, Br. (B. N. H. S.)

39. *Erebus macrops*, Linn.
1 ♀, Off coast of Persia, November 1917, Captain Simmonds.

40. *Homœa arefacta*, Swinh.
1 ♀, Amara, September 1918, P. A. B.; 20, Amara, July-October 1916, B. T.

41. *Parallelia algira*, Linn.
1, Basra, June, 7; Amara, August 1916, B. T.

42. *Grammodes geometrica*, Fabr.
1, Amara, October 1916, B. T.

43. *Chalciope hyppasia*, Cram.
4, Amara, August-October 1916, B. T.

44. *Leucanitis picta*, Christ.
1 ♀, Menjil, March 1919, P. A. B.

45. *Clytie arenosa*, Rothsch.
1 ♀, Amara, August 1916, B. T. ; 1 ♀, Kut, June 1918, Br. (B. N. H. S.).

46. *Pericyma albidentaria*, Frr.
1 ♂, Baghdad, October 1917, 2 ♂ ♂, Amara, June 1918 ; 1 ♀, Kut, August 1918, P. A. B. ; 3, Basra, June; 22, Amara, July-August 1916, B. T.

47. *Pericyma squalens*, Led.
3 ♀ ♀, Amara, April, June, July 1918, P. A. B.; 34, Amara, August 1916, B. T.

48. *Contyta profesta* (Christ.)
25, Amara, August 1916, B.T.; 1, Dyala River, June 1918, H. D. P.; 1, Kut, May 1918, Br. (B. N. H. S).; 2 ♂ ♂, 6 ♀ ♀, Amara, June-September; 2 ♂ ♂, 3 ♀ ♀, Kut, August 1918, P. A. B. ; 1, Jebel Hamrin, June 1919, H. D P.

Phylometrinæ (*Plusiinæ*, Auct.)

49. *Syngrapha circumflexa* (Linn.)
1, Mirjana, February ; 1, Kizil Robat, April 1919, H. D. P. ; 2 ♂ ♂ Amara, May 1918, P. A. B. ; 1 ♀, Kut, May 1918, Br. (B. N. H. S.).

50. *Phylometra ni*, Hübn.
1 ♂, Amara, May 1918, P. A. B.; 2, Amara, August 1916, B.-T. These specimens are very dark.

51. *Phylometra daubei*, Boisd.
1 ♂, Basra, August 1918, P. A. B.

52. *Phylometra chalcites*, Borkh.
1, Mirjana, February 1919, H. D. P. ; 2, Amara, August 1916, B. T.

53. *Phylometra gamma*, Linn.
8 Mirjana, January-February 1919, H. D. P.

Noctuinæ.

54. *Tarachephia hueberi*, Ersch.
2 ♀ ♀, Amara, May 1918, P. A. B.

55. *Hylodes caranea*, Guen.
1 ♀, Probably Karmanshah, Br. (B. N. H S.)

56. *Pandesma anysa*, Guen.

3 ♂ ♂, Kut, May 1918 1, Br. (B. N. H. S.); 1 ♂, 1 ♀, Amara, May-June 1918; 1 ♂, Qazvin, August 1919, P. A. B.

56*a*. *Apopestes spectrum innotata*, Warr.

7, Kermanshah, August 1918; 1, Kirkuk, September 1919, H. D. P.; 1 ♂, Qazvin, July 1919, P. A. B.

57. *Autophyla gracilis*, Stdgr.

1 ♀, Menjil, March 1919, P. A. B.

58. *Rivula sericealis*, Scop.

4 ♂ ♂, 3 ♀ ♀, Amara, October 1917-September 1918, P. A. B.; 1 ♀, Amara, September 1916, B.-T. This series is very variable.

Polypogoninæ (*Hypeninæ*, Auct.)

59. *Rhynchina eremialis*, Swinh.

1 ♂, 2 ♀ ♀, Amara, September-October 1918, P. A. B.; 1 ♂, Amara, September 1916, B.-T.

60. *Rhynchina ravalis syniocalis*, Stdgr.

3 ♂ ♂, 2 ♀ ♀, Amara, March-October 1918, P. A. B.; 2 ♀ ♀, Amara, August-October 1916, B.-T.

LEMONIIDÆ.

61. *Lemonia peilei*, sp. nov.

♂ Allied to *pia*, Püngl., but larger and the wings longer and narrower. Antennæ rufous chocolate; head, thorax, and abdomen dark testaceous buff. Forewing with apex strongly produced and pointed, costal edge deeply concave, costa and terminal edge bright yellowish buff, rest of wing pale cinnamon chocolate, a dark brown spot in cell ringed with buff, a submarginal band slightly convex and toothed basad primrose yellow. Hindwing cinnamon chocolate, a postmedian band, termen and fringe yellow.

Habitat—2 ♂, Mirjana, Dyala River, December 1918, H. D. P.

62. *Lemonia pia*, Püngl.

1 ♂, Qazvin, October 1919, P. A. B.

PYRALIDÆ.

Galleriinæ.

63. *Arenipses sabella*, Hmpsn.

2 ♂ ♂, 3 ♀ ♀, Amara, April-June 1918, P. A. B.; 1 ♀, August 1916, B.-T.

64. *Archigalleria buxtoni*, sp. nov.

♂, very much smaller than the ♀, forewings very short and at termen very square, giving the insect much the appearance of a *Hepialus*.

Antennæ grey brown; palpi, head and thorax pale grey mixed with mauve brown; abdomen dark brown grey.

Forewing pale grey powdered with brown scales; a partially broken black patch below median in basal $\frac{2}{3}$ths of wing, outer $\frac{2}{3}$ths of wing below subcostal area with strong cloud-like oil brown markings occupying almost the whole disc of the wing, a post discal whitish dentate band beyond which are black dots; a marginal line of black dots; a black brown patch followed by a white one with black brown spots in it below subcostal, fringe pale grey with chain of brown spots. Hindwing basal $\frac{1}{3}$ whitish passing gradually into the sooty black brown of remainder of wing, fringe greyish white.

♀. Antennæ greyish white annulated with brown; head, thorax and abdomen grey slightly sprinkled with brown. Forewing similar to ♂ but much paler and dark spots and markings smaller. Hindwing semivitreous white, with

brown grey terminal hairline. One specimen of the 5 has all light parts of forewings sandy buff as well as head, thorax and abdomen and 2 others have all these parts suffused with brown.

Length of forewing: ♂, 13 mm., ♀, 19 mm. Expanse: ♂, 29 mm., ♀ 42 mm.

Habitat—3 ♂♂, 5 ♀♀, Amara, June 1918, P. A. B.

65. *Lamoria anella*, Schiff.

2 ♂♂, Enzeli, May-June 1919, P. A. B.

Crambinæ.

66. *Ommatopteryx ramburella*, Dup.

5 ♂♂, 3 ♀♀, Amara, May 1917-June 1918; 1 ♀ Baghdad, September 1917; 1 ♀, Enzeli, June 1919, P. A. B.

67. *Ommatopteryx ocellea*, Haw.

1 ♂, 1 ♀, Amara, June 1918, P. A. B.

68. *Chilo phragmitellus*, Hübn.

1 ♂, Enzeli, June 1919, P. A. B.

69. *Chilo suppressalis*, Walk.

1 ♀, Amara, April 1918, P. A. B.

70. *Ancylolomia affinis*, sp. nov.

♂, Nearest to *palpella*, Schiff., but at once distinguishable by the entire absence of the silver bands on the median nervure and costo-subcostal area.

Palpi, head and thorox sandy buff; antennæ strongly pectinated, shaft white pectinatious brown black; abdomen whitish buff with broad brown bandlike markings, aval tuft white. Forewing sandy buff with intraneural brown bands which are dotted sparsely with minute black and silver dots; a broad silver streak from discocellulars to submarginal band which is brown and strongly dentate on both sides, wing from submarginal band to termen whitish with 2 brown lines, terminal line metallic. Hindwing pale brownish grey with darker terminal line; fringe white.

♀. Antennæ filiform brown; head and thorax pale buff; abdomen bush segment glistening white, rest pale buff. Forewing yellowish buff. Hindwing white.

Length of forewing: ♂ 20 mm., ♀ 24 mm.

Expanse: ♂, 43 mm., ♀, 52 mm.

Habitat—1 ♂, Amara, November 1917; 1 ♀, Qazvin, September 1919, P. A. B.

Siginæ (*Schœnobiinæ*, Auct.).

71. *Scirpophaga prælata*, Scop.

1 ♀, Enzeli, June 1919, P. A. B.

72. *Schœnobius incertellus*, Walk.

1 ♂, 5 ♀♀, Amara, June-July 1918; 1 ♀, Qurnah, May 1918, P. A. B.; 1 ♂, 1 ♀ =ab. *minutellus*, Zell; 2 ♀♀ =ab, *brunnesceus*, Moore.

I have not used the genus *Topentis* for *prælata* as Sir George Hampson has done because, although included in *Topentis* by Hübner; the genus *Topentis* was restricted by Stephens in 1829 as=*Chilo*, Zincken and therefore *prælata*, Scop.= *phantasmella*, Hbn, is excluded, the 4 species Stephens restricts *Chilo*=*Topentis* to, not including it.

Hypsotropinæ (*Anerastiinæ*, Auct.).

73. *Raphimetopus ablutella*, Zell.

1 ♀, Baghdad, October 1917; 1 ♀, Qazvin, July 1919, P. A. B.

74. *Saluria maculivitella*, Rag.

1 ♂, Baghdad, October 1917: 1 ♂, 3 ♀♀, Amara, October 1917 and June 1918, P. A. B.

75. *Saluria pulverosa*, Hmpsn.

3 ♂♂, 2 ♀♀, Baghdad, October 1917: 2 ♀♀, Azizieh, October 1917; 1 ♂, 4 ♀♀, Amara, October 1917—May 1918, P. A. B.

Anerastiinæ (*Phycitinæ*, Auct.).

76. *Ephestia cautella*, Walk.
1 ♀, Basra, September 1918 ; 1 ♀, Amara, April 1918 ; 1 ♀, Enzeli, May 1919, P. A. B.

77. *Ephestia elutella*, Hübn.
1 ♀, Amara, April 1918, P. A. B.

77*a*. *Ephestia inductella*, Stdgr.
2 ♂ ♂, Enzeli, June 1919, P. A. B.

78. *Ephestia calidella*, Guen.
1 ♀, Baghdad, September 1917; 3 ♂ ♂, Amara, June-September 1918, P. A. B.

79. *Spermotophora hornigii*, Led.
1 ♀, Basrah, September 1918 ; 1 ♀, Amara, September 1918 ; Baghdad, September 1917, P. A. B. ; 1 ♀, Amara, September 1916, B. T.
Larva found in August feeding on windfall Dates.

80. *Heterographis hellenica*. Stdg.
3 ♂ ♂, 2 ♀ ♀, Amara, April-September 1918, P. A. B.

81. *Heterographis subcandidatella*, Rag.
7 ♂ ♂, 3 ♀ ♀, Amara, May-July 1918, P. A. B.

82. *Heterographis convexella*, Led.
1 ♀, Amara, June 1918, P. A. B.

83. *Heterographis fulvobasella*, Rag.
1 ♀, Amara, June 1918, P. A. B.

84. *Heterographis monostictella*, Rag.
1 ♂, Amara, September 1918, P. A. B.

85. *Heterographis microshictella*, Hmpsn.
1 ♀, Amara, June 1918, P. A. B.

86. *Heterographis pallida*, Stdgr.
1 ♂, 1 ♀, Qazvin, July-August 1919, P. A. B.

87. *Heterographis buxtoni*, sp. nov.
♀. Antennæ brownish cream; head, thorax and abdomen cream colour. Forewings cream colour. Hindwings silvery white.
Length of forewings: 10 mm. Expanse: 22 mm.
Habitat—1 ♀, Baghdad, October 1917, P. A. B.

87*a*. *Heterographis deserticola*, Stdgr.
1 ♂, Qazvin, September 1919, P. A. B.

88. *Psorosa nucleolella*, Mæschl.
1 ♂, 1 ♀, Amara, June-October 1918, P. A. B.

89. *Lasiosticha hieroglyphiella*, Rag.
1 ♂, Qazvin, July 1919 ; 1 ♂, Amara, June 1918, P. A. B.

90. *Aphyteles ochreella*, Rag.
2 ♀ ♀, Amara, September 1918 ; 1 ♂, September 1919, P. A. B.

90*a*. *Melanastia cerraticornella*, Zell.
1 ♀, Amara, September 1918, P. A. B.

91. *Salebria acervella*, Eusch.
1 ♀, Baghdad, September 1917, P. A. B.

91*a*. *Laodamia fusca postalbidior*, subsp. nov.
Differs from *f. infausta*, Rag., in the much whiter hindwings.
Habitat—1 ♂, 1 ♀, Amara, April 1918, P. A. B.

92. *Auxacia bilineela*, Rag.
4 ♂ ♂, 6 ♀ ♀, Amara, June-September 1918, P. A. B.

93. *Tlithyia semirubella*, Scop.
1 ♂. 1 ♀, Amara, April-September 1918 ; 1 ♀, Enzeli, June 1919, P. A. B.

94. *Tlithyia buxtoni*, sp. nov.

♀ Antennæ grey; head and thorax silvery slate grey ; abdomen slate grey. Forewing slate grey, an oblique antemedian white band and 2 subterminal white lines, disc between oblique band and basal subterminal line except on costa and in cell variegated with greyish white. Hindwing silvery grey, whiter towards base, fringe white.

Length of forewing ; 11 mm. Expanse : 24 mm.

Habitat—1 ♀, Menjil, March 1919, P. A. B.

95. *Zophodia suberastriella*, sp. nov.

♀ closely allied to *erastriella*, Rag., but much greyer, less rufous.

Differs principally in having the curved oblique black antemedian line stopping short in cell and the postmedian line more sinuate and more strongly angled.

Length of forewing : 9 mm. Expanse : 20 mm.

Habitat—Enzeli, Caspian, June 1919, 1 ♀, P. A. B.

95*a*. *Eurhodope buxtoni*, sp. nov.

♂ Nearest to *monogrammos*, Zell, but smaller and without metallic fringe and submarginal line. Uniform mouse grey ; fringe of forewing and marginal lines of both wings darker.

Habitat—1 ♂, Amara, June 1918, P. A. B.

Length of forewing : 8 mm. Expanse : 18 mm.

Pyralinæ.

96. *Bostra marginalis*, sp. nov.

♀ Antennæ black partially ringed with white ; head and thorax blackish purple brown, slightly sprinkled with clay colour ; abdomen purple brown, sprinkled with yellowish wood brown.

Forewing sooty brown black, a pale antemedian angled band, a row of pale spots along costa, a black stigmatic patch at end of cell, a sinuate strongly dentate greyish buff postmedian line, termino-subterminal area beyond this line yellowish wood grey with a smoky line and terminal row of black dots in it. Hindwings silky wood brown paler on basal half, an indistinct yellowish median band, fringe yellowish grey, terminal line brown.

Length of forewing : 10-13 mm. Expanse : 22-28 mm.

Habitat—Amara, 1 ♀, November 1918, P. A. B. ; 2 ♀ ♀, August-September 1916, B.-T. (Type).

97. *Dattinia argentalis*, Hmpsn.

6 ♀ ♀, Amara, September 1918, P. A. B.

98. *Dattinia canifusalis*, Hmpsn.

1 ♂, 1 ♀, Amara, May 1918, P. A. B. ; 1 ♂, Kizil Robat, March 1919, H. D. P.

99. *Dattinia simplicialis*, sp. nov.

♀ Antennæ, head, thorax and abdomen chalk white. Forewing chalk white, a patch running in from apex to end of cell, a spot at end of cell, terminal line, and outer $\frac{2}{3}$ of inner margin very pale buff. Hindwing silky white with pale buff terminal line.

Length of forewing : 12 mm. Expanse : 27 mm.

Habitat—Amara, June 1918, 1 ♀, P. A. B.

There is a ♀ of the species mixed up with *leonalis*, Oberth, in the British Museum from Elkantara, Algeria.

100. *Dattinia affinis*, sp. nov.

♀ Nearest to *poliopastalis*, Hmpsn., in pattern, but with shorter rounder wings more like *vulgaris*, Butl.

Differs from *poliopastalis* in lacking all blue-grey tints, in having a snow white not buff first abdominal segment, in the antemedian band of forewings being much broader and straight not angled in the white markings of forewings being much closer together, and in the quadrate brown terminal markings not row of terminal black spots.

Length of forewing : 10 mm. Expanse : 22 mm.
Habitat—Kut, August 1918. 1 ♀, P. A. B.

101. *Botys armenialis*, Led.
1 ♂, Azizieh, October 1917 ; 1 ♀, Baghdad, October 1917 ; 5 ♀ ♀, Amara, September-October 1918, P. A. B.

Nymphulinæ.

102. *Nymphula nymphœata latifaseata*, subsp. nov.
♀ Differs from *n. nymphœata* in the bands of the hindwings being much broader, less irregular and less excised. The colour of the dark markings in this specimen is also much darker.
Habitat—Enzeli, June 1919, 1 ♀, P. A. B.
Staudinger already remarked that Syrian specimens were different.

103. *Nympkula nigrolinealis sordidior*, subsp. nov.
♂ Differs from *n. nigrolinealis*, Pryer, in the yellow being duller and the yellow marginal band on hindwings less even.
Habitat—Enzeli, June 1918, 1 ♂, P. A. B.

104. *Nymphula affinialis*, Gnen.
4 ♂ ♂, 7 ♀ ♀, Amara, April-June 1918, P. A. B.

Agroterinæ.

105. *Sylepta ruralis*, Scop.
1 ♂, 3 ♀ ♀, Enzeli, May-June 1919, P. A. B.

105*a*. *Ercta ornotalis*, Dup.
1 ♀, Amara, October 1917, P. A. B.

106. *Hellula undalis*, Fabr.
1 ♂, Enzeli, May 1919 ; 1 ♀, Qazvin, August 1919, P. A. B.

107. *Nomophila noctuella*, Schiff.
1 ♂, Enzeli, May 1219 . 1 ♂, Baghdad, October 1917 ; 1 ♀, Amara, April 1918, P. A. B. ; 1, Kizil Robat, February 1919 ; 1 Baiji. March 1920, H. D. P.

107*a*. *Psara pallidalis*, Hmpsn.
1 ♂, Enzeli, May 1919, P. A. B.

108. *Lonostege sulphuralis*, Hub.
1 ♂, Enzeli, June 1919, P. A. B.

109 *Loxostege palealis anaxisalis*, Walk.
1 ♂, Persian Talysh, July 1919, P. A. B.

110. *Loxostege sticticalis*, Linn.
1 ♂, 1 ♀, Persian Talysh, July 1919, P. A. B.

111. *Uresphiba polygonalis*, Hübn.
1 ♀, Amara, September, 1916, B.-T.

111*a*. *Cybolomia pentadalis*, Led.
2 ♂ ♂, Amara, June-September 1918, P. A. B.

112. *Metasia ochrifascialis*, Christ.
1 ♀, Kut, August 1918, P. A. B.

112*a*. *Metasia ossealis*, Stdgr.
2 ♀ ♀, Amara, June 1918, P. A. B.

113. *Pyrausta aurata*, Scop.
1 ♀, Enzeli, June 1919, P. A. B.

114. *Pyrausta cespitalis*, Schiff.
2 ♂ ♂, Amara, March-April 1918, P. A. B.

115. *Tegostoma baphialis*, Stdgr.
3 ♂ ♂, 2 ♀ ♀, Amara, April-September 1918 ; 1 ♀, Qazvin, July 1919, P. A. B. ; 2 ♂ ♂, 1 ♀, Amara, July-August 1916, B.-T.

116. *Tegostoma paralis*, Hmpsn.
1 ♀, Baghdad, September 1917; 1 ♂, Qazvin, July 1919, P. A. B.

117. *Noctuelia floralis*, Hübn.

2 ♀ ♀, Amara, May-September 1918; 1 ♂, 2 ♀ ♀, Baghdad, September 1917; 1 ♀, Qazvin, July 1919; 1 ♀, Menjil, March 1919, P. A. B.

As the nomenclature employed may be strange to some of the readers of this journal I give below the 1st quotation of the name of each species :—

1. *Noctua peltigera*, Schiffermuller and Denis; *Aukünd. Syst. Werk. Schmett. Wier. Geg.*, p. 89, Class W. No. 1. (1775) (Vienna).

2. *Heliothis nubigera*, Herrich-Schiiffer, *Syst. Bearb. Schmett. Eur.*, Vol. II., p. 366 (1845) (Asia Minor).

3. *Agrotis golickei*, Erschoff, *Hor. Entom. Ross*, Vol. VIII., p. 316 (1871) (Turkestan).

4. *Luperina lasserrei*, Oberthur, *Etud. Entom. Fasc.* VI., p. 86, pl. 11, ff. 13, 14 (1881) (Magerta, Algeria).

5. *Heliophobus matritensis*, Vasquez, *Bol. Espan. Hist. Nat.*, 1905, p. 116, f. 1 (Madrid).

6. *Noctua segetum*, Schiffermuller and Denis, *Aukünd. Syst. Werk. Schmett Wier Geg.*, pp. 81, No. 12, 252, pl. 1, ff. 3a, b (1775) (Vienna).

7. *Noctua spinifera*, Hiibner, *Samm. Europ. Schmett.Noct.*, f. 389 (1808) (Europe).

7*a*. *Agrotis cognita*, Standinger, *Stett. Entom. Zeit.*, 1881, p. 417 (Ala Tau).

8. *Noctua conspicua*, Hiibner, *Samml. Europ. Schmett. Noct.*, ff. 718-719 (1830) (Europe).

9. *Phalaena, ipsilon*, Hufuagel, *Berl. Mag.*, Vol. III, p. 416, No. 99 (1766) (Berlin)=*Noctua suffusa*, Schiffermüller and Denis, *Aukünd Syst. Werk. Schmett. Wier. Geg.*, p. 80, No. 4 (1775) (Vienna.)=*Noctua Ypsilon*, Rottenburg, *Naturf.*, Vol. IX., p. 141, No. 99 (1776) (Berlin).

In Vol. 4 of the British Museum Catalogue of *Lepidoptera Phalænae* Sir George Hampson has used Rottenburg's name of *Ypsilon* for this insect. He did this on the assumption that the "Wiener Verzeichniss" appeared in 1776 in which case the Vol. IX of the "Naturforscher" has some weeks priority; but the "Wiener Verzeichniss" like so many of the older works was first put on the market in a few copies in 1775 under the title Ankundigungerves, &c., as an experiment, and when it was found successful, the remainder of the edition was issued in and dated 1776; therefore all names given in this work must date from 1775. Thus *suffusa*, Schiff, would, at first sight, appear to be the correct name by priority; but it is not so. Apparently Sir George Hampson has not thoroughly studied Rottenburg and Hufnagel's lists, but has relied too implicitly on Staudinger's "Catalogue." The fact is that Rottenburg's list is merely a critical survey of Hufnagel's work and in nearly every case Rottenburg's names published in 1776 must be quoted as being of Hufnagel, 1766, this latter author having 10 years priority.

10. *Noctua comes*, Hübner, *Samml. Europ. Schmett.*, f. 521 (1818) (Europe)= *Noctua comes*, Treitschke, *Schmett. Eur.*, Vol. V., part I., p. 254, No. 2 (1825) (Europe).

In Vol. 4 of the British Museum Catalogue Sir George Hampson gives priority to Treitschke (1825) as author of the name *comes* over Hübner. This he does because nearly all through his various lepidopterological books and articles, he has taken 1827 as the date both of Hübner's "Sammlung Europäischer Schmetterlinge" and of his "Verzeichniss bekannter Schmettlinge" whereas the date of the first part of the first edition of the "Sammlung" is 1796 and of the 2nd edition, 1805 and parts of the "Verzeichniss" appeared from 1816 to 1826.

11. *Phalæna pronuba*, Linnæus, *Syst. Nat.*, Edit. X., p. 512, No. 87 (1758) (Sweden).

12. *Noctua margaritosa*, Haworth, *Lepid. Brit.*, p. 18, No. 156 (1809) (Great Britain).

13. *Discestra arenaria*, Hampson, *Cat. Lepid. Phal. Brit. Mus.*, Vol. V., p. 16, No. 1139, pl. LXXVIII, f. 25 (1905) (Sind).

14. *Phalæna trifolii*, Hufnagel, *Berl. Mag.*, Vol. III., part IV., p. 398, No. 70 (1766) (Berlin)=*Noctua trifolii*, Rottenburg, Naturf, Vol. IX, p. 131, No. 70 (1776) (Berlin).

Here again Sir George Hampson in Vol. 5 of the British Museum Catalogue follows Staudinger and gives Rottenburg as author of the above name, whereas the 1st author and describer was Hufnagel.

14*a*. *Scotogramma chimaera*, Rothschild, *Novit. Zool.*, Vol.

16. *Noctua vitellina*, Hübner, *Samml. Europ. Schmett.*, ff. 379, 589 (1803) (Europe).

17. *Noctua loreyi*, Duponchel, *Hist. Nat. Lépid France.*, Vol. VII, part I, p. No. CCCCXXVIII (1827) (Province).

18. *Leucania indistincta*, Christoph, *Rom. Mém Lépid.*, Vol. III., p. 79, pl. 4, f. 5 (1887) (Kisil-Arwat).

19. *Leucania corrugata*, Hampson, *Faun. Brit. India Moths.*, Vol. II, p. 278, No. 1923 (1894) (Simla).

20. *Noctua tanaceti*, Schiffermüller and Denis, *Ankünd Syst. Werk. Schmett. Wier. Geg.*, p. 73, class T., No. 5 (1775) (Vienna).

21. *Cleophana boetica diluta*, Rothschild, *Ann. Mag. Nat. Hist.* (8) VIII., p. 232, No. 2 (1911) (Bon Saada).

22. *Metopoceras sacra var. caspica*, Alpheraky, *Tris.*, Vol. VIII, p. 171 (1895) (Tekke, Caspian).

23. *Acronycta pontica*, Staudinger, *Hor. Soc. Entom. Ross.*, Vol. XIV, p. 364 (1879) (Kerasdere).

24. *Noctua litura*, Fabricius, *Syst. Entom.* p. 601, No. 50 (1775) (I India Orientalis).

25. *Spodoptera abyssinia*, Guenèe, *Hist. Nat. Ins. Spec. Gen. Lépid.* Vol. V. *Noct.* I., p. 154, No. 244, (1852) (Abyssinia).

26. *Noctua exigna*, Hübner, *Samml. Europ. Schmett. Noct.*, f. 362 (1803) (Europe).

27. *Phalæna clavipalpis*, Scopoli, *Entom. Carn.*, p. 213, No. 526 (1763) (Carniolia).

28. *Caradrina pertinax*, Staudinger, *Hor. Soc. Entom Ross.*, Vol. XIV, p. 387 (1879) (Kerasdere).

30. *Catamecia jordana* var. *bacheri*, Staudinger, *Cat. Lépid. Palaar. Fauneng.* Edit. III., Part I, p. 213, No. 2192*a*, 1901 (Dead Sea).

31. *Noctua parva*, Hübner, *Samml. Europ. Schmett.*, f. 356 (1803) (Europe).

32. *Thalpochares uniformis*, Staudinger, *Hor. Soc. Entom. Ross.*, Vol. XIV., p. 414 (1879) (Schahrud, Persia).

32*a*. *Agrophilas sulphuralis* var. *algira*, Oberthur, *Etud. Entom.*, Fasc. VI., p. 90 (1881) (Bône).

33. *Acontia lucida* var. *lugens*, Alpheraky, *Rom. Mem. Lépid.*, Vol. V., p. 182, No. 118 (1889) (Babatagh).

34. *Earias chlorophyllana*, Staudinger, *Tris*, Vol. IV., p. 249 (1891) (Mardin).

35. *Euxestes dentula*, Lederer, *Hor. Soc. Entom. Ross.*, Vol. VI., p. 89., pl. V., f. 8. (1870) (Astrabad).

35*a*. *Catocala mesopotamica*, Kusnezov, *Revue Russe Entom.*, p. 74, No. 2680. (1903) (Nomen novum).

36. *Noctua neonympha*, Esper, *Schmett.*, part IV., Vol. 2, p. 75, 251st sp., pl. CXCVIII., Noct, 49, f. 1, 2 (1796) (Sarepta.)

37. *Catocala elocata* var. *locata*, Staudinger, *Tris.*, Vol. IV., p. 327 (1891) (Taschkend, Margelan).

38. *Catocala puerpera* var. *pallida*, Alpheraky, *Mem. Lépid Roman.*, Vol. III p. 406 (1887) (Lob-noor-Ak-Su).

39. *Phalæna macrops*, Linnæus, *Syst. Nat.*, Edit. XII, Vol. III., p. 225 (1768) (India Orientalis).

40. *Remigia arefacta*, Swinhœ, *Proc. Zool. Soc., Lond.*, 1884, p. 521, No. 63 (Karachi).

41. *Phalæna algira*, Linnæus, *Syst. Nat.*, Edit. XII, Vol. I., part II, p. 836, No. 98 (1767) (Algeria).

42. *Noctua geometrica*, Fabricius, *Syst. Entom.*, p. 599, No. 37 (1775) (India Orientalis).

43. *Phalæna hyppasia*, Cramer, *Pap. Exot.*, Vol. III, part XXI., p. 99, pl. CCL, f. E. (1779) (Coast of Coromandel).

44. *Leucanitis cailino* var. *picta*, Christoph, *Hor. Soc. Entom. Ross.*, Vol. XII., p. 257, No. 22, pl. 7, f. 28 (1877) (Krasnowodsk).

45. *Clytie arenosa*, Rothschild. *Novit. Zool.*, Vol. XX., p. 128, No. 69 (1913) (S. Oned Mya).

46. *Acidalia albidentaria*, Freyer, *Neu. Beitr. Schmetterlingsk.*, Vol. 4, part 59, p. 115, No. 597, pl. 354, f. 1 (1842) (S. Russia).

47. *Pericyma squalens*, Lederer, *Verh. Zool.-bot. Ver. Wien.*, Vol. V., p. 184, pl. 5, f. 11 (1855) (Cyprus).

48. *Pericyma profesta*, Christoph, *Entom. Zeit. Stett.*, Vol. 48, p. 165 (1887) (Askhabad).

49. *Phalæna circumflexa*, Linnæus, *Syst. Nat.*, Edit. XII, p. 844, No. 128 (1767) (Europe).

50. *Noctua ni*, Hübner, *Samml. Europ. Schmett. Noct.*. f. 284 (1802) (Europe).

51. *Plusia daubei*, Boisduval, *Gen. et. Ind. Meth. Europ. Lepid.*, p. 159, No. 1281 (1840) (Spain, Andalusia).

52. *Noctua chalcites*, Esper, *Schmett.*, Vol. I., part IV, pl. CXLI, Noct. 62, f. 3 (ante 1792); Borhausen, *Syst. Beschr. Europ. Schmett.* (Naturg. Europ. Schmett.) part 4, p. 774, No. 352 (1792) ; Esper, Vol. I., part IV., p. 447, spec. 167 (1796-1805) (Central Italy).

53. *Phalæna gamma*, Linnæus, *Syst. Nat.*, Edit. X., p. 513, No. 91 (1758) (Sweden).

54. *Acontia hueberi*, Erschoff, in *Fedtschenko Voyage au Turkestan Lepid*, p. 49, pl. III., f. 47 (1874) (Desert of Kisil-Kum).

55. *Hulodes caranea*, Guenèe, *Hist. Nat. Ins. Spec. Gen. Lepid.*, Vol. VII., Noct. III., p. 208, No. 1608 (1852) (Yova, Sylhet, &c.).

56. *Pandesma eanysa*, Guenèe, *Hist. Nat. Ins. Spec. Gen. Lepid.*, Vol. VI., Noct. II., p. 439, No. 1311 (1852) (Central India).

56*a*. *Apopestes spectrum innotata*, Warren, in *Seitz Grossschmett. Erde.*, Vol. 3, p. 370, pl. 68b (1913) (Amaria, Syria).

57. *Spintherops gracilis*, Standinger, *Entom. Zeit. Stett.*, Vol. 35, p. 95 (1874) (Krasnosowodsk).

58. *Phalæna sericealis*, Scopoli, *Entom. Carn.*, p. 242, No. 615 (1763) (Carniolia).

59. *Rhychina eremialis*, Swinhoe, *Proc. Zool. Soc., Lond.*, 1889, p. 417 (Hydrabad).

60. *Hypena ravalis*, var. *syriacalis*, Staudinger, *Tris.* Vol. IV., p. 335 (1891) (Syria).

62. *Lemonia pia*, Püngler, *Tris.*, Vol. XV., p. 143, No. 2, pl. 6, f. 17 (1902) (Dead Sea).

63. *Arenipses sabella*, Hampson, in *Mèm. Lepid. Roman.* Vol. VIII., p. 501, No. 93, pl. XXIV., fig. 1 (1901) (Fao).

65. *Tinea anella*, Schiffermüller and Denis, *Aukünd Syst. Werk. Schmett. Wier. Geg.*, p. 135, No. 30 (1775) (Vienna).

66. *Crambus ramburiellus*, Dupouchel, *Hist. Nat. Lepid. France*, Vol. 10, Coutin, Vol. VII, p. 83, No. MCCCLXXXII., pl. 270, f. 8. (1836) (Ajaccio).

67. *Palparia ocellea*, Haworth, *Lepid. Brit.*, Part III, p. 486, No. 21 (1811) (London).

68. *Tinea phragmitella*, Hübner, *Samml. Europ. Schmett.*, ff. 297-298 (1811) (Europe).

69. *Crambus suppressalis*, Walker, *List Spec. Lepid. Ins. Brit. Mus.*, part XXVII., p. 166, No. 108 (1863) (Shanghai).

71. *Phalæna prælata*, Scopoli, *Entom. Carn.*, p. 198, No. 494 (1763) (Carnialia).

72. *Chila incertulas*, Walker, *List Spec. Lepid. Ins. Brit. Mus.*, part XXVII, p. 143, No. 15 (1863) (Sarawak).

73. *Anerastia ablutella*, Zeller, *Tris.* 1839, part III, col. 177, No. 4 (Sicily).

74. *Saluria maculivittella*, Ragonot, *Ann. Soc. Entom. France.*, Vol. LVI. (Ser. 6, Vol. 7), p. 258, No. 181 (1887) (Gabes ; Mt. Elder ; Marghilan).

75. *Poujadia pulverosa*, Hampson, *Faun. Brit. Ind. Moths.*, Vol. IV., p. 60, p. 73, No. 27 (1863) (Ceylon).

76. *Pempelia cautella*, Walker, *List Spec. Lepid. Ins. Brit. Mus.*, part XXVII, p. No. 4302 (1896) (Sind).

77. *Tinea elutella*, Hübner, *Samml. Europ. Schmett*, f. 163 (1796) (Europe).

77*a*. *Ephestia inductella*, Staudinger, *Hor. Soc. Entom. Ross.*, Vol. XV., p. 229 (1880) (Amasia).

78. *Ephestia calidella*, Guenèe, *Europ. Microl. Ind. Meth.*, p. 82 (1845) (Islands of Hyères).

79. *Spermatophora hornigii*, Lederer, *Verh. Zool. Bot. Ver. Wien.*, Vol. II., p. 133 (1852) (Vienna).

80. *Myelois rhodochrella* var. *hellenica*, Staudinger, *Hor. Soc. Entom. Ross.*, Vol. VII., p. 209, No. 597, pl. II, f. 18 (1871) (Africa).

81. *Heterographis subcandidatella*, Ragonot, *Ann. Soc. Entom. France.*, Vol. LVI. (Ser. 6, Vol. 7), p. 249, No. 126 (1887) (Marghilan).

82. *Myelois convexella*. Lederer, *Verh. Zool. Bot. Ver. Wien.*, Vol. V., p. 222, pl. 4, f. 9 (1855) (Beirut).

83. *Heterographis fulvobasella*, Ragonot, *Ann. Soc. Entom. France.*, Vol. LVI., (Ser. 6, Vol. 7), p. 248, No. 123 (1887) (Shatrud).

84. *Heterographis monostictella*, Ragonot, *Ann. Soc. Entom. France.*, Vol. LVI. (Ser. 6, Vol. 7), p. 249, No. 127 (1887) (Derbent).

85. *Heterographis microstictella*, Hampson, *Journ. Bomb. Nat. Hist. Soc.*, Vol. XV., p. 23 (1903).

86. *Myelois pallida*, Staudinger, *Berl. Entom. Zeitschr.*, Vol. 14, p. 202, No. 40 (1870) (Sarepta).

87*a*. *Myelois deserticola*, Staudinger, *Berl. Entom. Zeitschr.*, Vol. 14, p. 201, No. 39 (1870) (Sarepta).

88. *Nephopteryx nucleolella*, Möschler, *Berl. Entom. Zeitschr.*, Vol. 10, p. 147 (1866) (Sarepta).

89. *Pempelia hieroglyphiella*, Ragonot, *Ann. Soc. Entom. France.* Vol. LVI. (Ser. 6, Vol. 7), p. 244, No. 95 (1887) (Astrabad).

90. *Tephris ochreella*, Ragonot, in *Mèm. Lèpid. Roman.*, Vol. VII., p. 448, pl. XIII., f. 13 (1893) (Shahrud).

90*a*. *Nephopteryx serraticornella*, Zeller. *Tris.*, 1839, part III, col. 179 (1839) (S. Europe).

91. *Alispa acervella*, Erschoff in Fedtschenko, *Voy. au Turk.*, p. 90, No. 309, pl. V., f. 94 (1874) (Kisil-Kum).

92. *Aria bilineella*, Ragonot, *Ann. Soc. Entom. France*, Vol. LVI. (Ser. 6, Vol. 7), p. 235, No. 50 (1887) (Turkistan).

93. *Phalæna semirubella*, Scopoli, *Entom. Carn.*, p. 245. No. 623 (1763) (Carniolia).

97. *Constantia argentalis*, Hampson, *Trans. Entom. Soc., Lond.*, 1900, p. 380, No. 6a (Syria).

98. *Constantia canifusalis*, Hampson, *Trans. Entom. Soc., Lond.*, 1900, p. 381, No. 7b, pl. 111, f. 16 (Algeria, &c.).

101. *Cledeobia armenialis*, Lederer, *Ann. Soc. Entom. Belg.*, Vol. 13, p. 51, No. 14, pl. 11, ff. 7, 8 (1869-1870) (Transcaucasia).

104. *Nymphula affinialis*, Guenèe, *Hist. Nat. Ins. Spec. Gèn. Lèpid.*, Vol. VIII., p. 270, No. 259 (1854) (Central India).

105. *Phalœna ruralis*, Scopoli, *Entom. Carn.*, p. 242, No. 616 (1763) (Carniolia).

105*a*. *Asopia ornatalis*, Duponchel, *Hist. Nat. Lèpid. France*, Vol. VIII., pt. II., p. 207, No. MXXX., pl. 223, f. 8 (1831) (France).

106. *Phalœna undalis*, Fabricius, *Entom. Syst.*, Vol. III., part II., p. 226, No. 362 (1794) (Italy).

107. *Tinea noctuella*, Schiffermüller and Denis, *Ankünd. Syst. Werk. Schmett. Wier. Geg.*, p. 136, No. 35 (1775) (Vienna).

107*a*. *Pachyzanclapallidalis*, Hampson, *Ann. Mag. Nat. Hist.* (8) XI., p. 513, No. 18c (1913) (Tenimber).

108. *Pyralis sulphuralis*, Hübner, *Samml. Europ Schmett.*. ff. 166, 167 (1818) (Europe).

109. *Botys anaxisalis*, Walker, *List. Lepid. Ins. Brit. Mus.*, Part XVIII., p. 658, No. 194 (1859) (Shanghai).

110. *Phalœna sticticalis*, Linnæus, *Fauna Suecica*, Edit. II., p. 352, No. 1354 (1761) (Sweden).

111. *Pyralis polygovalis*, Hübner, *Samml. Auserl. Vög. and Schmett*, p. 76, (1793).

111*a*. *Botys pentadalis*, Lederer, *Verh. Zool. Bot. Ver. Wien.*, Vol. V., p. 217 (1855) (Beirut).

112. *Metasia ochrifascialis*, Christoph, *Hor. Soc. Entom. Ross.*, Vol. XVII, p. 121, No. 11 (1883) (Ordubat).

112*a*. *Metasia ossealis*, Staudinger, *Hor. Soc. Entom. Ross.*, Vol. XV., p. 182 (1880) (Asia Minor).

113. *Phalœna aurata*, Scopoli, *Entom. Carn.*, p. 227, No. 565 (1763) (Carniolia).

114. *Pyralis cespitalis*, Schiffermüller and Denis, *Ankünd, Syst. Werk. Schmett. Wier. Geg.*, p. 123, No. 32 (1775) (Vienna).

115. *Anthophilodes baphialis*, Staudinger, *Hor. Soc. Entom Ross.*, Vol. VII., p. 183, No. 503, pl. II., f. 7 (1870) (Astrochan).

116. *Tegostoma paralis*, Hampson, *Trans. Entom. Soc., Lond.*, 1900, p. 399, No. 3a (Namangan).

117. *Pyralis floralis*, Hübner, *Samml. Europ. Schmett.*, f. 142 (1800) (Europe).

The numbers left out of the list of first quotations are those of species and sub-species described as new in the body of the paper.

I have enumerated 133 species and sub-species in my section consisting of 64 *Noctuidæ*, 2 *Lemoniidæ* and 67 *Pyralidæ*. There are 4 *Noctuidæ*, 1 *Lemoniidæ* and 11 *Pyralidæ* described here for the first time, making 16 new species and subspecies.

MOTHS OF MESOPOTAMIA AND N. W. PERSIA.

PART II.

SPHINGES & BOMBYCES.

BY

H. T. G. WATKINS

AND

P. A. BUXTON, M.A., F.E.S., Fellow of Trinity College, Cambridge.

General remarks on the affinities of the Mesopotamian fauna would be out of place in a short paper devoted to systematics. One new species and one new sub-species are described below :

Sphingidæ.

1. *Acherontia styx*, Westw.

One, July, one. August 1916, Amara, B.-T.; one, Baghdad, 10th October 1917, P. A. B. ; one, 30th May 1917, Amara, B. N. H. S. Closely allied to *A. atropos*, of Europe.

2. *Herse convolvuli*, L.

One, 15th May 1918, Baghdad—" 11-30 p.m. at light. Insect settled on plaster wall. Large wall lizard advanced towards it from in front, halting about 8 inches away. Lizard attacked, biting insect on left fore wing, costa near thorax, injuring this region. Insect escaped after struggle, fell to ground and was secured.

N.B.—Sphingid moths seem very liable to attack by wall lizards, as I have witnessed this also in *C. lineata* and *T. alecto*. Owing to their size they also made their escape in the encounters mentioned," W. E. Waller.

3. *Deilephila nerii*, L.

One, Amara, 20th November 1916, C ; one, 16th November 1918, Basra, C. ; one, 30th April 1919, bred from Basra larva, B. N. H. S. ; one, 30th March 1919, Beit Na'ama, " one caught, several seen," W. E. E.

4. *Celerio lineata*, Fab., subsp. *livornica*, Esp.

One, Amara, 7th May 1918, P. A. B. ; one, May 1918, Kut ; Qizil Robat, 14th March to 10th April 1919, " the moth fairly common by day at a white-flowered scabious ; larva found on small plantain, pupated April 21st, emerged 11th May " ; moth at light 15th May, H. D. P.

5. *Celerio nicœa*, de Prunner.

One, Kermanshah, 1918, Br. This specimen is of the typical European race and not of the subspecies *lathyrus*, Wlk., of which the type from N. India is in the British Museum. A coloured sketch of the showy larva, and a full description of it was sent home by Col. Peile. This larva was found on a rock high up at Harir, N. W. Persia, 12th September 1918 ; the food-plant is spurge (*Euphorbia*).

6. *Hippotion celerio*, L.

Two, Beit Na'ama, Basra, 26th March and 1st April 1919, at light, W. E. E.

7. *Theretra alecto* subsp. *cretica*, Boisd.

We have seen specimens collected in every month from March to September, at Basra, Amara and Baghdad. Buxton found pupæ at Amara, one on the ground under a log, and another under the bark of a *Zizyphus* tree four feet from the ground ; both were completely without any cocoon or earthen cell.

8. *Pergesa elpenor*, L.

One, 27th June 1919, Enzeli, Caspian Sea, P. A. B. This specimen is of the typical European form.

9. *Laothoe kindermanni*, Lederer.

One, ♀, Ararat, Kurdistan, C. This specimen is of the typica race. Two (1 ♂, 1 ♀,) 16th November 1918, Basra, C., are subsp, *orbata*, Gr. which is lighter and more uniformly marked. The species is allied to *L. ocellatus* of Europe.

10. *Macroglossa stellatarum*, L.

We have examined a number of specimens collected in September, October and November at Basra, Amara, Baghdad, Mirjana, Khaniqin, Kirkuk, and Kermanshah and two collected in April at Beit Na'ama, near Basra, W. E. E. " one, 18th November 1918, Mirjana, near Qizil Robat; often comes into tents seeking hybernation ; ibid, 27th January 1919," H. D. P.

Hypsidæ.

11. *Callimorpha quadripunctaria*, Poda (=*hera*, L).

13th July to 19th August 1918, Harir and Karind, W. Persia. " In large numbers settled on leaves of trees a few feet from the ground, easy to catch ; August 10, abundant still but more females ; 19th August nearly over," H. D. P.

Arctiidæ.

12. *Utetheisa pulchella*, L.

We have seen a large series collected in every month between 2nd May and 1st November from Nasiriych, Amara, Baghdad, Mirjana near Qizil Robat, Jebel Hamrin on the River Diyala, Kut, Kirkuk, and Assur. The moth is continuously on the wing throughout this period, and Buxton took two specimens freshly emerged at Amara on 23rd October. Peile found larvæ in dozens at Mirjana from December to February.

13. *Ocnogyna lœvii*, Zell.

Five males taken at light between 11th December 1918 and 7th January 1919 at Mirjana, H. D. P.: Like a small pale *Arctia ;* the ♀ has rudimentary wings.

14. *Pelosia muscerda*, Hufn.

One, 31st May 1919, Enzeli, Caspian Sea, P. A. B.

15. *Pelosia uniformis*, sp. nov.

Lord Rothschild has been good enough to give us this description for insertion " Female uniform wood-brown. Forewing with three obsolete darker dots on veins 3, 4 and 7 respectively. Hindwings slightly paler. Length of forewing 10 mm. Expanse 23 mm. 1 ♀, Enzeli, Caspian Sea, 1st June 1919, P. A. Buxton." The type is in the Tring Museum.

Lasiocampidæ.

16. *Lasiocampa grandis*, Rogenh. (=*salomonis*, Stgr.)

One male, 30 May 1917, Amara, C. This specimen agrees with the description and figure in Seitz's *Macrolepidoptera* of the world. *L. grandis* is already known from Palestine, and there appears very little doubt that this specimen belongs to that species, but we have been unable to compare it with actual specimens.

17. *Lasiocampa terreni*, H. Sch.

One male, 23rd October 1919, Mosul, H.D.P. This specimen appears to be referable to the above species but is more silvery over the whole upper surface except the fringes, than the only specimen in the British Museum, a male from Transcaucasia.

18. *Chilena proxima*, Stgr.

One male " probably from Kut ", B. N. H. S. ; one male, 12 May 1918. Baghdad, at light. (W. E. Waller).

19. *Taragama siva*, Lef.

First brood : male bred 27th April 1918, Amara, W. E. E. ; female. 28th April 1918, Amara, at light, P. A. B. Second brood : male, 27th September 1916, Amara, B. T ; male on poplar tree, 4th October 1918, W. E. E.; 1 ♂, 1 ♀, 16th November 1918, Basra, C. The larva feeds on the common shrub (*Prosopis*)

which is generally called acacia; and its colour makes it exceedingly difficult of detection even when a number of larvæ are resting on a bush which they have rendered almost leafless; the general colour of the larva is a warm purplish brown, and it flattens itself over the surface of the stem in the manner of its relative the Lappet Moth (*Gastropacha*) in Great Britain.

Lymantriidæari d.(Læ)ip

20. *Lymantria dispar*, L.

2 ♂, 13th July 1918, Harir, W. Persia, H. D. P.

21. *Ocnerogyia amanda*, Stgr.

3 ♂, 1 ♀, 28th July 1918, Ba'qubah, River Diyala, P. A. B. This moth though almost unknown in collections is a serious pest of figs in Mesopotamia; it completely defoliates the trees, and has been received from various parts of the Diyala basin and from Kerbela; it was originally described from Mardin in the extreme north of Mesopotamia. Notes on its ravages, life history and structure have been published by one of us in Bull. Ent. Res. XI., pp. 181—186. (1920).

22. *Ocneria signatoria*, Christoph, subsp. *pœnitens*, Stgr.

1 ♀, Baghdad, 9th October. 11 ♀, Aziziyeh, River Tigris, 14th October 1917, at light, P. A. B.

23. *Arctornis* (*Porthesia*) *chrysorrhœa*, L.

One female, 29th June 1919, Enzeli, P. A. B.

Notodontidæ (*Ceruridæ*).

24. *Dicranura vinula*, L., subsp. *intermedia*, Teich.

1 ♀, Ararat, Kurdistan, C; 1 ♀, 24th September 1918, Qalat Saleh, River Tigris, P. A. B. In the British Museum there is a female from Quetta, and a male from Fao, very like these specimens, but there are no specimens from Syria. This form is possibly a species distinct from *D. vinula*.

Zygænidæ.

25. *Zygæna dorycnii*, O.

Half a dozen specimens of both sexes from Tula Rud, Persian Talish, 3-8th July 1919. The species was fairly common flying over grass and settling on flowers of chicory, close to the shore of the Caspian, P. A. B.

26. *Procris solana*, Stgr.

1 ♂, 30th March 1919, Menjil, valley of Sufed Rud, N. W. Persia, alt. 2,000 ft. (P. A. B.)

27. *Procris micane*, Frr.

1 ♂, 28th March 1919, Menjil. P. A. B. It is curious that the only two "foresters" taken at the same time and place represent quite different species; these were the only ones seen though a special effort was made to find more.

Cossidæ.

28. *Cossus araraticus*, Teich.

1 ♂, 29th May 1919, Enzeli, P. A. B.

29. *Holcocerus gloriosus*, Stgr., subsp., *mesopotamicus*, n. subsp.

2 ♂, 3 ♀, 28th June 1918, Kut; Br. 5 ♀, 30th May to 28th June 1918, Amara, P. A. B. It appears that the Mesopotamian race of this insect is undescribed, and as we have been able to compare the above specimens with 9 specimens from Bokhara, the terra typica, we feel justified in describing the race as new: it differs from the typical form in that all the spots on the forewing are enlarged into blotches, with the exception of the spots at the base of the fringe. The type is a female collected at Kut by Major Broughton, and has been presented to the British Museum by the B. N. H. S.

MOTHS OF MESOPOTAMIA AND N. W. PERSIA.

Part III.

GEOMETRIDÆ.

By

Louis B. Prout.

Subfamily—*Hemitheinæ.*

1. Chlorissa pulmentaria, Guen.

Nemoria pulmentaria, Guen, Spec. Gen. Lep., IX., 349 (1858).

"Mesopotamia", without more exact data, 1 ♀, very rubbed, apparently referable to this species (Br.)

Staudinger records *C. pulmentaria* from Syria, Asia Minor, Armenia and N. Persia, as well as a great part of Europe and Central Asia, but as the closely allied Indian species *solidaria*, Guen., extends to Fao on the Persian Gulf, it is possible that some of his records, together with the present one, are really referable to *solidaria*.

2. Microloxia polemia, Prout.

Microloxia polemia, Prout, Nov. Zool, XXVII, 300 (1920).

Kut al Amara, 3 ♀ ♀, 7-9th August 1918 (P. A. B.)

The description of this interesting new species, as also that of *Lithostege buxtoni*, appeared in 1920. The types are in my collection. No. 1 of the "Novitates." Rather broader-winged than *halimaria*, Chret., the markings sometimes rather suggestive of *Xenochlorodes beryllaria*, Mann, the hindwing even more fully rounded.

Subfamily—*Sterrhinæ.*

3. Scopula ornata, Scop.

Phalæna ornata, Scop., Ent. Carn., 219 (1763).

Enzeli, N. W. Persia, 2 ♂ ♂, 1st May and 30th June 1919 (P. A. B.)

The earlier specimen is worn, the later probably represents a second brood. The species has not hitherto been recorded from Persia and the form may prove racially differentiable.

4. Scopula nigropunctata, Hufn.

Phalæna nigropunctata, Hufn., Berl. Mag., IV., 526 (1767).
Acidalia strigilaria, Stgr. and Rbl., Cat. Lep. Pal. (i), 275 (1901).

Enzeli, N. W. Persia, sea level, 2 ♀ ♀, 6th and 30th June 1919 (P. A. B.)

5. Scopula ochroleucata, H.-Sch.

(*Acidalia*) *ochroleucata*, H.-Sch., Syst. Bearb. Schmett. Eur., III. t. 3, f. 21-23 (1844).
Acidalia ochroleucaria, H.-Sch., tom. cit. p. 24 (1847).

Baghdad, 2 ♂ ♂, 22nd September; 1 ♂, 25th September; 1 ♂, 7th October 1917 (P. A. B.)

Amara, 1 ♂, 2nd November 1918; 5 ♀ ♀, 2nd April, 15th June, 22nd June, 28th October, 19th November 1918 (P. A. B.)

Qazvin, N. W. Persia, 1 ♂, 17th July 1919 (P. A. B.)

Variable as usual, the Amara ♀, dated 2nd April, much larger than the rest. At Baghdad the species was common in melon patches.

Staudinger only records *ochroleucata* under its own name from the Canaries and a few Mediterranean countries, referring to most of the N. African and Asiatic localities under "*remotata*, Guen. (præc. sp. forma Darw. ?)" It is certainly all one and is doubtfully distinct, even racially, from *minorata*, Bdv. (S. Africa, Madagascar, Mauritius, etc.)

6. Sterrha politata, Hb.

Phalæna Geometra politata, Hb., Väg. u. Schmett. p. 5, f. 1 (1793).

Enzeli, sea level, 2 ♂ ♂, 28th May, 1 ♂, 8th June, 1 ♀, 29th June 1919 (P. A. B.)

All are referable to the form *abmarginata*, Bhtsch., which seems racially constant in some places (*e.g.*, Hungary), while in others it occurs with the name-type. I am not sure, however, that these Persian specimens may not form a separable race from the European—slightly less glossy, more tinged with straw-colour, costal markings rather weak, subterminal line broad (in the sole ♀ almost reaching the distal margin), underside rather sharply marked.

7. Sterrha elongaria, Rbr.

Dosithoea elongaria, Rbr., Ann. Soc. Ent. Fr., II, 38 (1833).

Kut al Amara, 2 ♀ ♀, 9th August 1918 (P. A. B.)

Obscurely marked specimens with a strong sandy tone of colour, somewhat doubtfully referred to this widely distributed and variable species, which perhaps still comprises more than one not yet satisfactorily differentiated.

Subfamily—*Larentiinæ*.

8. Rhodometra sacraria, Linn.

Phalæna Geometra sacraria, Linn., Syst. Nat. (ed. 12) I (2) 863 (1767).

Baghdad, 3 ♂ ♂, 1 ♀, 23rd September 1917 (P. A. B.)

Amara, River Tigris, 4 ♀ ♀, 11th May, 14th June, 16th June and 20th June 1918, P. A. B.

Shahroban, Dyala River (close to Persian border) 1 ♂, 30th July 1918 (P. A. B.).

Kut al Amara, 1 ♂, 9th August 1918 (P. A. B.)

Not very variable, all referable broadly to the name-typical form. On an average small, especially the Baghdad specimens.

9. Lythria purpuraria, Linn.

Phalæna Geometra purpuraria, Linn., Syst. Nat. (ed. 10) I, 522 (1758).

Qazvin, N. W. Persia, 4,000 feet, 1 ♂, 30th July 1919 (P. A. B.)

Belongs to the form *lutearia*, Vill., which seems prevalent in the summer generation in eastern localities. New for Persia (?).

10. Lithostege buxtoni, Prout.

Lithostege buxtoni, Prout, Nov. Zool., XXVII, 312 (1920).

Kangavar, Hamadan, N. W. Persia, 5,000 feet, 1 ♂, 6th December 1918 (P.A. B.), the type of the species.

Shergat (Asshur), Mesopotamia, 1 ♂, 27th December 1919, at light (H. D. P.)

A very interesting new species, forming (together, perhaps, with "*Anisopteryx*" *chaoticaria*, Alph., which is unknown to me) a new section of the genus, characterized by the long ciliation of the ♂ antenna. Apparently variable, the second specimen darker than the type, with the longitudinal curved white stripe of the forewing more sharply expressed.

11. LITHOSTEGE FARINATA, Hufn.

Phalæna farinata, Hufn., Berl. Mag. IV, 610 (1767).

Mirjana, near Kizil Robat, Dyala River, 1 ♂, 20th February 1919, flying by day (H. D. P.)

Kizil Robat, 1 ♂, 1 ♀, 23rd and 28th February 1919 (H. D. P.)

Apparently new for Mesopotamia, though recorded from Palestine and Armenia.

12. ORTHONAMA OBSTIPATA, Fab.

Phalæna obstipata, Fab., Ent. Syst. III (2), 199 (1794).
Larentia fluviata Stgr. and Rbl., Cat. Lep. Pal. (i), 298 (1901).

Amara, River Tigris, 1 ♂ (small), 15th June 1918, 2 ♀ ♀, 1st May and 2nd November, 1918 (P. A. B.)

Enzeli, N. W. Persia, 1 ♂, 1 ♀, (small), 28th May 1919.

A migrant, found nearly throughout Europe and Continental Asia, besides a great part of America.

13. CŒNOTEPHRIA ALFACARIATA, Rbr.

[ ] *alfacariata*, Rbr., Cat. Syst. Lep. Andal. (2) t. 18, f. 1 (1866).

Cidaria ibericata, Stgr., Cat. Lep. Eur. (ed. 2) 187 (1871).

Menjil, N. W. Persia, 2,000 feet, 1 ♂, 30th March 1919, at light (P. A. B.)

Darker and more strongly marked, with a stronger cell-spot, than our western forms, but I think referable here. Not hitherto recorded from further east than Palestine. The similar *reclamata* Püng. is more elongate-winged, with the hindwing whiter.

14. EUPHYIA POLYGRAMMATA, Bkh.

Phalæna Geometra polygrammata, Bkh., Naturg. Eur. Schmett, V, 560 (1794).

Enzeli, N. W. Persia, sea level, 2 ♀ ♀, 14th and 20th June 1919 (P. A. B.).

New for Persia, though known from Asia Minor and Turkestan.

15. EUPITHECIA CENTAUREATA, Schiff.

Geometra centaureata, Schiff., Schmett. Wien. 114 (1775).
Tephroclystia oblongata, Stgr. and Rbl., Cat. Lep. Pal. (i), 308 (1901).

Enzeli, N. W. Persia, sea level, 1 ♀, 26th May 1919 (P. A. B.).

Already known from Syria, Armenia, Transcaspia, etc.

16. EUPITHECIA ULTIMARIA, Bdv.

Eupithecia ultimaria, Bdv., Gen. et Ind. Meth., 210 (1840).

Amara, River Tigris, 1 ♂, 3rd April 1918, 1 ♀ at light, 15th June 1918 (P. A. B.).

New for Mesopotamia. Both examples have the underside very sharply marked and are probably referable to the form *opisthographata*, Dietze (Iris, xix., 66).

17. GYMNOSCELIS PUMILATA, Hb.

Geometra pumilata, Hb., Samml. Eur. Schmett. IV., t. 75, f. 388 (1808-17).

Astara, N. W. Persia, sea level, 1 ♀, 4th July 1919, (P. A. B.).

Qazvin, N. W. Persia, 1 ♀, 2nd October 1919, (P. A. B.).

Recorded from Mesopotamia and Armenia but not, I think, from Persia.

Sub-family—*Geometrine.*

18. CABERA PUSARIA, Linn.

Phalæna Geometra pusaria, Linn., Syst. Nat. (ed. 10), i., 522 (1758).

Enzeli, N. W. Persia, sea level, 1 ♂, 21st June 1919, 1 ♂ and 1 ♀, 30th June 1919 (P. A. B.).

19. MACARIA NOTATA, Linn.

Phalæna Geometra notata, Linn., Syst. Nat. (ed. 10) i., 523 (1758).

Enzeli, N. W. Persia, sea level, 1 ♀, 24th April 1919 (P. A. B.).

20. MACARIA SIGNARIA, Hb.

Geometra signaria, Hb., Samml. Eur. Schmett., IV., t. 61, f. 313 (1800-08).

Talysh, Persian S. W. Caspian, sea level, 1 ♂, 9th July 1919 (P. A. B.). New for Persia, though known from Armenia.

21. MACARIA ÆSTIMARIA, Hb.

Geometra æstimaria, Hb., Samml. Eur. Schmett., IV., t. 64, f. 333 (1800-08).

Amara, 1 ♀, 15th June 1918 (P. A. B.).

By the shape, tone and underside I think this example really belongs here and not to the following, which is evidently the common *Macaria* of the region.

22. MACARIA SYRIACARIA, Stgr.

Macaria æstimaria var. *syriacaria*, Stgr., Cat. Lep. Eur. (ed. 2) 160 (1871).

Kut al Amara, 3 ♀ ♀, 18th June 1915 (1918), 18th and 28th June 1918, also one labelled "Mesopotamia" and undated (Br.); 2 ♀ ♀, 8th and 9th August 1918 (P. A. B.); Amara, 5 ♂ ♂, 1st May, 28th June (2), 10th and 26th August 1918; 12 ♀ ♀, 23rd April ("common"), 25th April, 9th June, 2nd and 4th July. 8th August, 9th August (2), 1st September, 6th September ("2 among weeds in garden") 30th September and 28th October, all in 1918 (P. A. B.); 1 ♂. 31st August 1918, at light (W.E.E.)

Previously recorded from Syria, Cyprus, Armenia and Transcaspia and in the form *tenuiata*, Stgr., from N. Persia. Standinger regards the last named as a possibly distinct species, but unless he would treat the whole of the material before me as referable to it—which is gainsaid by his diagnosis—I think it is *syriacaria* which is the species, with *tenuiata* as an ab. The distal margin of the hindwing is somewhat less crenulate than in *æstimaria* and there are other appreciable differences.

The series is variable. One ♀ (25th April) belongs to the extreme aberration *tenuiata*, a second (25th April) is almost as extreme and the earliest ♂ (1st May) in large measure corresponds, though the dark postmedian line is finer and reaches the costa. It is thus suggested that this form may be characteristic of a first generation or of the earliest emergences. The specimen taken by Capt. Evans is a pretty aberration with strong bands, on the hindwing accompanied distally by a large, irregular dark spot in the middle.

23. TEPHRINA DISPUTARIA, Guen.

Eubolia (?) *disputaria*, Guen., Spec. Gen. Lep. X., 489 (1858).

Amara, cultivated ground by the Chahala Canal, 1 ♂, 24th August 1917 (W.E.E.).

24. ECTROPIS BISTORTATA, Goeze.

Phalæna Geometra bistortata, Goeze, Ent. Beytr., III (3), 438 (1781).

Enzeli, Gilan, N. W. Persia, sea level, 1 ♀, 30th June 1919 (P. A. B.).

Apparently not very different from our western forms. The range of these widely-distributed species in the Orient is not yet well ascertained, but Staudinger records it (presumably) under the erroneous name of *crepuscularia* from Armenia.

25. GNOPHARMIA COLCHIDARIA, Led.

Gnophos colchidaria, Led., Ann. Soc. Ent. Belg. XIV., 39, 48 (1870).

Menjil, N. W. Persia, semi-desert hills, 2,000 feet, 2 ♂ ♂, 26th and 28th March; 4 ♀ ♀, 26th, 28th and 29th March and 7th April 1919 (P. A. B.).

New for Persia but described from Transcaucasia. Unfortunately I have little material for comparison and the genus needs further study as regards geographical variation. The form before me is darkish, with the contrasts of ground colour and bordering beneath not extremely pronounced.

26. GNOPHARMIA COLCHIDARIA OBJECTARIA, Stgr. (?) (sp. div. ?)

Gnopharmia colchidaria var. *objectaria*, Stgr., Iris V., 183 (1892).

Qazvin, N. W. Persia, 4,000 feet, 1 ♂, 27th August 1919.

Lighter and more variegated with reddish than the foregoing, the contrasts of the undersurface extreme. The latter distinction is probably more weighty than the former, as the response of the upperside to the immediate environment is such a marked feature in the *Gnophos* group.

27. ZAMACRA FLABELLARIA, Heeger.

Amphidasis flabellaria, Heeger, Beitr. Schmett., p 6, f. 6-11 (1838).

Mirjana, near Kizil Robat, Dyala River, 10 ♂ ♂, 6 ♀ ♀, 7th January 1919 (H. D. P.)

More variegated with white than my examples from Syria and on the whole rather large.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 30, 1921.]

ANNOTATED LISTS OF ACULEATE HYMENOPTERA (EXCEPT HETEROGYNA) AND CHRYSIDS RECENTLY COLLECTED IN MESOPOTAMIA AND NORTH-WEST PERSIA.

BY

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(*With eight Text Figures.*)

(*Continued from p.* 828, *Vol. XXVII.*)

29. *Andrena bimaculata*, Kirby var.—1 ♂, Resht (P), 18th February.

According to Schmiedeknecht's tabulation in *Apid. Europ.* This should be *basalis*, Sichel, and it is coloured exactly according to Sichel's description. It can, however, have nothing to do with *albicrus*, of which Sichel supposed *basalis* to be a variety.

Having examined the genitalia, I feel sure that this specimen (and probably *basalis* also !) is merely one of the many highly coloured forms of *bimaculata* which are common in most Mediterranean districts, and occur exceptionally even in England (*decorata*, Sm., etc.) though there they seem to appear only in the second brood. (I have taken one at Wisley (Surrey) in August, which is very nearly as red as Captain Buxton's specimen). *Magrettiana* Schmied. which I found abundant near Naples in March and April, and a ♂ given to me (I believe by Perez) as *atrorubricata*, Dours, seem to be also local varieties of *bimaculata*. I have met with still more highly coloured forms in Tunisia but I do not doubt that these also may be referred to *bimaculata*, K.

30. *Andrena thoracica*, F.—8 ♂ ♂, Resht (P), 1 ♀, 11th-18th February.
1 ♂, 1 ♀, Enzeli (P), 14th-19th June.

31. *Andrena gwynana*, Kirby.—2 ♀ ♀, Resht (P), 25th-27th February.

32. *Andrena lucens*, Imhoff.—5 ♂ ♂, Resht (P), 11th-18th February.

33. *Andrena dorsata*, Kirby.—1 ♂, Resht (P), 18th February.

34. *Andrena flavipes*, Pauzer. (=*fulvicrus*, K.), 1 ♂, Resht (P), 18th Febr.,
1 ♂, 1 ♂, Menjil (P), 30th March, 7th April.
8 ♂ ♂, 8 ♀ ♀, Amara (M), 24th March to 18th April.
13 ♀ ♀, Amara (M), 14th May to 19th June.

The March-April Amara specimens are smaller than either those from Persia or the May-June Amara ♀ ♀, but their ♂ ♂ have the peculiarly "notched" stipites of the genital armature by which a *flavipes* ♂ may, I believe, always be identified. (cf. Tr. Ent. Soc. Lond., 1899, p. 237, where the species is called "*fulvicrus*.") The Persian ♂ ♂ shew the same character, but unluckily no ♂ ♂ were taken with the May-June Amara ♀ ♀, and some (but not all) of these differ from normal *flavipes* ♂ ♂ in having the hind femora and tibiæ more or less testaceous. But I believe this character is not specific. Something like it occurs with the "second broods" of other *Andrena* spp. (*e.g. dorsata*) In my opinion all the specimens here recorded should be referred to one species, viz., *flavipes*.

Of all *Andrena* spp. *flavipes* is perhaps the most widely distributed, and its main distinguishing characters seem to be exceedingly constant in all districts. Unless a specimen is badly 'rubbed' there can be little difficulty in determining it.

35. *Andrena hypopolia*, Pérez.—3 ♀ ♀, Qazvin (P), 7th July.

36. *Andrena*, sp ?—2 ♂ ♂, 2 ♀ ♀, Amara (M), 24th March-April.

I had thought that these specimens also were *hypopolia*, but after examining the ♂ genitalia I now doubt it. Unfortunately all the specimens are more or less rubbed and faded, so I think it most prudent to leave them nameless.

37. *Andrena cyanescens*, Nyl.—1 ♀, Amara (M), 24th March.

I think this determination is correct, but the specimen has met with an accident and the femora, tibiæ and tarsi of both hind-legs are missing !

38. [*Andrena vetula*, Lep.—1 ♀, Basrah (M), 6th April 1919.—Captain Evans.

39. *Andrena cordialis*, Morawitz.— 1 ♀, Basrah (M), 31st March 1919.—Captain Evans.]

I know this species only from the author's description, but the latter seems to agree well with the characters of the specimen before me.

40. *Cilissa leporina*. —1 ♀, Qazvin (P), 17th July.

41. *Nomia diversipes*, Latr.—1 ♂, Qazvin (P), 27th July.

42. *Nomia edentata*, Moraw.—22 ♂♂-17 ♀♀, Amara (M), 1st June to 9th September.
1 ♀, Khaniqin (M), 1st July.
1 ♂, 1 ♀, Baquba (M), 27th July.

The integument in these specimens varies greatly in colour; it may be entirely black, or the abdomen and propodeum may be largely, or even entirely red. The most highly coloured examples before me are males, but at least one ♀ has the whole abdomen dark red. I believe this is merely a matter of individual aberration. It does not seem to be accompanied by any structural differences.

43. *Nomia rufiventris*, Spim.—1 ♀, Amara (M), April.

Spinola's description suits this specimen perfectly. I believe that Morawitz's *rufescens* is the same species. The puncturation is very sparse and feeble, and the basal pilosity of the abdominal tergites consists of long, thin, (not at all scale-like), hairs. The abdomen (but not the propodeum) is entirely red, except the apical margins of the tergites, which are bright yellow.

44. *Eucera dentata*, Klug.*—1 ♂, Enzeli (P), 14th June.

45. *Eucera malvæ*, Rossi.—1 ♂. 1 ♀, Talish (P), 10th July.
1 ♂, Enzeli (P), 14th June.

46. *Eucera radoszkovskyi*, Morawitz.—1 ♂, 1 ♀, Qazvin (P), 17th-24th July.

47. *Eucera distinguenda*. Morawitz.—1 ♂, Amara (M).
[1 ♂, Beit-Na'ama near Basrah (M), 12th April 1919.—Captain Evans.]

48. *Eucera longicornis*, L.—1 ♂, Amara (M), 15th February.
3 ♀♀, Amara (M), 24th March.
1 ♀, Amara (M), 30th March.

These appear to me to belong to the true *longicornis*, L., having the thorax punctured just as in specimens from Britain and other North European countries.

49. *Eucera tuberculata*, F.—1 ♂, Resht (P), 20th March.
1 ♀, Resht (P), April.

This species is the *longicornis*, L., of Friese in *Bienen Europa's*, but apparently not that of Linné. In calling it *tuberculata* I am following the opinion of Herr Alfken, *Bienenfauna von Bremen* (1913).

50. *Nomada fucata*, Panzor.—1 ♂, Amara (M), April.

51. *Nomada tigridis*, n. sp.—1 ♂, Amara (M), 30th March.
4 ♀♀, Amara (M), 28th May-8th June.

This is a fairly large and conspicuously coloured species, but I can find no description to suit it, though several more or less similar forms are recorded by Morawitz (*robusta*, *regalis*, etc.)

The antennæ in both sexes are short and thick with the 3rd joint somewhat shorter than the 4th and the joints near the apex about as broad as long. The mandibles are acuminate ; the labrum has a very slight central tuberculation (hardly to be called a tooth) at its apex. The ♀ hind tibiæ have incrassate apices with a sort of small black knob-like projection at each corner (as viewed from behind), between which projections three or four pale subequal spines may be

* This and the next three spp. belong to the *Macrocera* division of *Eucera*.

seen among the fringing hairs. The apical tergite of the ♂ abdomen is deeply incised, so that its apex is bifid or might even be called bispinose.

The general colour of the ♀ is reddish or ferruginous-orange, with the tips of the mandibles, the propodeum, and the apices of the intermediate abdominal tergites, generally also the breast and pleuræ (partly) black. The head and mesonotum either entirely ferruginous, or with more or less blackening of the ocellar area, and some ill defined vittæ on the mesonotum. The pronotum humeral tubercles tegulæ and scutellum are paler (yellowish), the two last abdominal segments have broad fasciæ of a brighter yellow, and there may be taces of similar fasciæ (or at least of lateral spots) on the preceding segments but these, if present at all, are almost obsolete. The antennæ and legs, including the coxæ, are ferruginous or yellowish, with no black marking except at the extreme apex of the hind tibiæ. The punctuation of the head, thorax, and propodeum is close, rather coarse, and more or less reticulate. That of the abdomen is very minute and close, making the tergites look quite dull, except their extreme apices which are impunctate and very slightly shining. The wings are darkened almost throughout, but darkest along their apical margins. The pilosity is short and very scanty, hardly noticeable except, of course, at the apex of the abdomen.

The ♂ has the head (except the face) and the thorax except the pronotum, tubercles, tegulæ, scutellum, and a small spot on the post scutellum black. The abdomen is coloured as in the ♀, except that its extreme base is occupied by a black mark (triangularly produced in the middle). The antennæ are streaked with black over a few of the intermediate joints behind, and the coxæ of all the legs are black. The pilosity of the head and thorax in this sex is pretty long, and much more conspicuous than in the ♀.

Length 9 to 11 mm.

52. *Lasius* (=*Anthophora*) * *albigenus*, Lep.—2 ♂ ♂, Amara (M), 4th-9th Sept. 1 ♀, Baquba (M), 27th July.

53. *Lasius quadrifasciatus*, Vill.— 1 ♀, Qazvin (P), 17th July.

54. *Lasius farinosus*, Kl.—3 ♂ ♂, Baquba (M), 27th July; 2 ♂ ♂, Amara (M), 18th-20th July.
3 ♀ ♀, Amara (M), 10th June (on *Capparis*), 18th-20th July.
[1 ♀, "at or near Amara", 27th August 1918—Captain Evans.]

The specimens before me agree well with Klug's description, and seem to me distinguishable from the commoner *quadrifasciatus* by the much smaller black markings on the face, the testaceous underside of the antennæ (the scape is also lined beneath with whitish-yellow), and the somewhat broader abdominal white fasciæ which are not simply linear, but distinctly dilated in the middle. (In another form belonging to the same group, *viz.*, *wegeneri*, Friese, these fasciæ are on the contrary dilated *at their sides*!) The integument of the abdomen beneath in all these specimens is more or less rufescent at least at the base.

55. *Lasius garrulus*, Rossi.—1 ♂, Talish (P), 10th July; 3 ♀ ♀, Enzeli (P), 30th June and July.

56. *Lasius Kessleri*, Morawitz.—1 ♀, Beit Na'ama, near Basrah (M), 31st March 1919.—Captain Evans.

57. *Lasius* (*Saropoda*) *byssinus*, Klug.—1 ♀, Amara (M), 7th July.

I have not seen this species before, but feel sure that it is the true *byssinus*. Almost the whole body, except the black triangle at the apex is clothed with white (or whitish), subsquamose, decumbent hairs. The antennæ beneath, the coxæ, trochanters, and femora of all the legs, and the ventral side of the abdomen are testaceous. The front trochanters and femora are fringed on both sides with

* *Lasius*, Jurine (1801) has priority over *Anthophora* (Latr) 1802 and invalidates *Lasius* F et auctt (1804).

a row of slightly curving, suberect, white hairs. Of the hind-legs the femora are nearly naked ; but the knees, tibiæ, and bases of the metatarsi have a beautiful snow-white scopa externally, while the other hairs of these joints are absolutely black. The present ♀ (like Klug's type) is 11 mm. long.

58. *Lasius pilipes*, F.—7 ♂♂, Resht (P), 18-25th February ; 1 ♀, Enzeli (P), 24th April.

The ♀ is that common Continental form which has its pilosity coloured like that of the ♂, (not black as in British specimens).

59. *Melecta armata*, Pauzer.—1 ♀, Resht (P), 25th February.

60. *Crocisa ashabadensis*, Radosz.—1 ♀, Amara (M), 14th June.

61. *Xylocopa olivieri*, Lep.—1 ♂, 1 ♀, Baquba (M), 30th July.

I have noticed, both in Greece and in Syria, that the ♂♂ of this species have the curious habit of suddenly visiting flowers in great numbers about the time of sunset. Earlier in the day that sex is usually nowhere to be found.

62. *Xylocopa fenestrata*, F.— 3 ♂♂, Amara (M), 10th-19th June, 1st September.

3 ♀♀, Amara, 1st May, 10th June (visiting *Capparis*), 19th June.

[1 ♂, Beit Na'ama near Basrah (M), 23rd March 1919 "at *Papaver somniferum*."—Captain Evans.]

This is a common "Oriental" species, only exceptionally reaching Palearctic districts !

63. *Xylocopa violacea*, L.—4 ♀♀, Enzeli (P), 8th, 14th, and 17th June.

64. *Ceratina tibialis*, Morawitz.—1 ♂, Amara (M), 8th June ; 1 ♂, Baquba (M), 21st July.

2 ♂♂, 9 ♀♀, Amara (M), 12th September

[3 ♀♀, near Basrah, 31st March 1919—Captain Evans].

65. *Ceratina nigrolabiata*, Friese.—1 ♂, Amara (M), 9th September ; 1 ♀ Baquba, 27th July.

The ♀ is very small, and may possibly be some species unknown to me. The clypeus is almost impunctate on its disc, and the frontal area and mesonotum are very sparsely punctured and shining. But in coloration it exactly matches a *nigrolabiata* ♀ named for me by the author of the species.

66. *Ceratina laevifrons*, Morawitz.—1 ♀, Shahroban (M), 21st July ; 1 ♀ Baquba (M), 27th July.

67. *Ceratina cyanea*, Kirby.—1 ♂, 2 ♀♀, Enzeli (P), 6th June.

One of the ♀♀ is not quite a normal specimen, having a very small yellow spot in the middle of its clypeus. But I believe this is merely an individual aberration.

68. *Chelostoma emarginatum*, Ngl.—1 ♀, Enzeli (P), 1st May.

I give this name with some little doubt, because I only know the species in literature, and the present specimen has no less than 10 alar hooks, which does not agree with Schletterer's statement in Zool. Jahrb., 1889 (p. 619). But its other characters suggest *emarginatum*, and that species has been previously recorded from N. W. Persia.

69. *Osmia cœrulescens*, L.—1 ♀, Qazvin (P), 17th July.

70. *Osmia indigotea*, Morawitz (?)—1 ♂, 1 ♀, near Basrah (M), 31st March 1919.

71. *Osmia panzeri*, Morawitz.—1 ♂ near Basrah (M), 12th April 1919.

These specimens (70 and 71) were all taken by Captain Evans in the same locality and I thought at first that they were conspecific. But the very different ventral segments of the two ♂♂ shew that this is not so, and I believe the

determinations given of them above are probably correct. It is almost impossible, however, to name, for certain, ♂♂ of this section without special preparation of the specimens, the actual apex of the abdomen being nearly always imperfectly exposed.

72. *Osmia dimidiata*, Morawitz.—4 ♂♂, Enzeli (P), 8th-14th June.
73. *Anthidium florentinum*, F.—2 ♂♂, Enzeli (P), 10th-23rd July.
2 ♀♀, Talish (P), 5th-10th July.
1 ♀, Qazvin (P), 17th July.
74. *Anthidium strigatum*, Panzer.— 1 ♀, Baquba (M), 27th July.

The specimen is below the usual size, and its ground colour, instead of being simply black, is partly rufescent both on the thorax and abdomen. Probably this may be an individual aberration, but it may again be characteristic of a special local race. I do not think the peculiarity is "specific." [Captain Evans took a ♂ near Basrah on 12th April 1919.]

75. [*Anthidium tessellatum*, Kl.—1 ♂, Tanooma (M), Lieut. Harwood, "October."]
76. *Stelis phœoptera*, Kirby.—1 ♀, Talish (P), 10th July.
1 ♀, near Basrah (M), 6th April 1919.

The Persian specimen was very much larger than the Mesopotamian.

77. [*Stelis signata*, Latr.—1 ♂, near Basrah, 10th April 1919.—Captain Evans.]
78. *Lithurgus chrysurus*, Fonsc.—3 ♂♂, 4 ♀♀, Enzeli (P), 15th-17th June.
79. *Lithurgus tibialis*, Morawitz.— 1 ♂, Khaniqin (M), 1st August.

This specimen agrees exactly with Morawitz's description. In May 1896 I took at Dakrur in Egypt a ♂ which was determined for me by Prof. Friese, no doubt correctly, as belonging to this species. But it was a much smaller specimen than that here recorded, and the paradoxical characters of its hind legs (perhaps only for that reason) appear to me not quite so well developed. In the Figure below (Fig. 5) I have tried to give the exact outline of the right hind leg in Captain Buxton's specimen, when so placed that its *inner* side almost directly faces the object glass of the microscope. (The legs are clothed, rather thinly, with white hairs, which are very long and fine in the angle between the femora and tibiæ, much shorter and more bristle-like on the metatarsus, but I have not attempted to show this pilosity in the Figure.)

As usual in *Lithurgus* spp., the ♂ genitalia are extremely small for the size of the insect. I notice that in this species the interval which separates the posterior ocelli from each other is at least twice as great as that between each of them and the nearest compound eye. This is not the case in *chrysurus*, where the difference in length between the corresponding spaces is very slight.

When viewed from behind the hind tibiæ are seen to be not only *dilated*, but very *incrassate*, only, however, about half as much so as the femora.

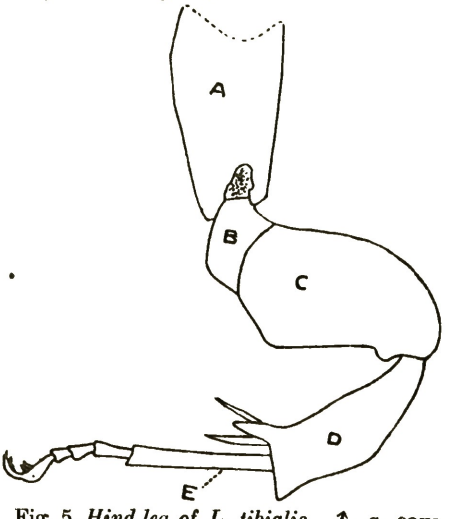

Fig. 5. *Hind-leg of L. tibialis* ♂, *a.* coxa-*b.* trochanter, *c.* femur, *d.* tibia, *e* metatarsus.

80. *Megachile argentata*, F.—1 ♂, Amara (M), 20th July: 2 ♂♂, Baquba (M), 27th July.
1 ♀, Shahroban (M), 31st July.
[1 ♂, below Amara (M), "about Tamarisk" 31st August.—Captain Evans.]

About 20 specimens, smaller than the above, but apparently all *argentata* ♂♂ and ♀♀ were also taken at or near Amara by Captain Buxton in June, July, and September. Some of those taken in September were visiting Sunflowers, others *Zizyphus*.

81. *Megachile minutissima*, Radosz (?)—13 ♂♂, 14 ♀♀, Amara (M), 28th May to 14th June.
1 ♂, 2 ♀♀, Shahroban (M), 31st July.

I have named these chiefly in consequence of having compared them with ♂♂ which I took in Egypt in 1899, and which were determined for me as *minutissima* by Professor Friese. But except in size (and not very much even in that!) they differ very little from *argentata* ♂♂. Captain Buxton's ♀♀, however, certainly differ from *argentata* ♀♀ in having no silvery pilosity on the last abdominal segment. All these specimens, both ♂♂ and ♀♀, are small, but they vary considerably in size, and it is curious that the smallest of them all are ♀♀! One of these is only 6 mm. long, while another measures fully 8 mm. (Radoszkowsky gives 7 mm. as the length of the ♀, and 6 as that of the ♂).

82. *Megachile rotundata*, F.—6 ♂♂, Astara (P), 2nd July, 1 ♀, Enzeli (P), 6th June.
1 ♀, Talish (P), 10th July.

83. *Megachile schnabli*, Rad.—3 ♂♂, Amara, 14th and 17th June, 6th September.
[1 ♀, 6th September, "garden below Amara."—Captain Evans.]

All these ♂♂ agree with Radoszowsky's description, except that the colour of the abdomen seems to be altogether variable. In one specimen (June 17th) it is completely reddish, and the scutellum is red also! In the other two the antennæ, legs, and venter are red, but the dorsal surface of the body shews hardly any tendency to rufescence. The pilosity of all three specimens is very dense and silvery, giving them that peculiar sheen which characterizes so many desert-frequenting Hymenoptera.

84. *Megachile flavipes*, Spin.—13 ♂♂, 8 ♀♀, Amara (M), 28th May to 9th August.
2 ♀♀, Qazvin (P), 17th July.

85. *Megachile maritima*, K.—1 ♀, Enzeli (P), 30th June.

86. *Megachile centuncularis*, L.—1 ♂, Talish (P), 10th July; 1 ♀ Enzeli (P), 20th June.

87. *Cœlioxys conoidea*, Klug.—2 ♂♂, 1 ♀, Talish (P), 5th-10th July.

88. *Cœlioxys elongata*, Lep.—1 ♀, Enzeli (P), 8th June; 1 ♀, Talish (P), 10th July.

89. *Cœlioxys decipiens*, Spin.—1 ♂, 8 ♀♀, Amara (M), 10th-14th June. (visit flowers of *Acacia*.)

90. *Cœlioxys argentea*, Lep.—1 ♂, Qazvin (P), 17th July.

91. *Cœlioxys brevis*, Eversm.—1 ♂, Talish (P), 11th July.

92. *Cœlioxys afra*, Lep.—1 ♂, Amara (M), 12th September.

93. *Cœlioxys hæmorrhoa*, Forst.—2 ♂♂, Amara (M), 18th July, 9th September.
1 ♀, Baquba (M), 27th July.

94. *Cœlioxys coturnix*, Pèrez (?)—1 ♀, Amara (M), June 26th (also, between June 19th and 22nd at Amara a ♂ which seems to belong to the same form).

In both these specimens the abdomen is practically unicolorous, rosy-testaceous throughout! Otherwise the ♀ appears to have exactly the characters by which Pérez separated his *coturnix* from *hæmorrhoa*. (He was not acquainted with the ♂). There is the same 'powdering' over of the vertex, mesonotum, etc., etc., with silvery scales (mostly oval in form, but some of the smaller ones almost circular!) the same fine close puncturation, and the same sort of "caréne" which Pérez describes as running into the "premarginal depression" of the 6th abdominal dorsal-plate.

I took at Biskra in Algeria 2 ♀ ♀ which seem to differ from Captain Buxton's specimen only in being much smaller, and these were recorded by Edward Saunders in *Trans. Ent. Soc., Lond.*, 1908, p. 241 as "*coturnix*, Pérez(?)." I have also taken a ♀ at Jericho which is slightly larger than the Amara ♀, and has two of its abdominal segments (the 4th and the 5th) blackish above. Otherwise this also agrees with the Mesopotamian form.

The ♂ so much resembles the ♀ in colour and general appearance, and was taken so nearly at the same time, that I can scarcely doubt that the two are conspecific. Apart from colour and pilosity I have not succeeded in finding any substantial difference to distinguish it from *hæmorrhoa* ♂. The "eight teeth" on the apex of the abdomen seem to be very similar and arranged in the same way. (Fig. 6. Outlines of the 6th abdominal tergite viewed from above. I have not attempted to represent the fovcation, pilosity, etc., of the segment. As in *hæmorrhoa* it is deeply and widely sulcate down the middle, and clothed with scale-like hairs at its base.)

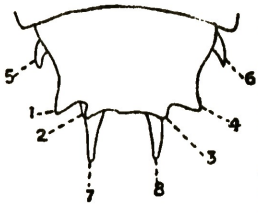

Fig. 6. *Outlines of 6th abdominal tergite in C. coturnix.*

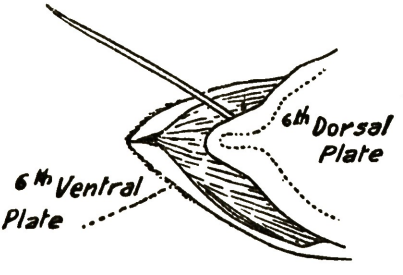

Fig. 7. *Apex of abdomen in C. coturnix.*

(Fig. 7 represents the apex of the ♀ abdomen viewed from above. The dotted lines are meant to give an idea of the "premarginal depression" and what Pérez calls its "interruption" by the carina which projects into it.

The apex of the 6th ventral plate seems to be quite pointed, not narrowly truncate and very slightly emarginate, as usually in *hæmorrhoa*.)

95. *Cœlioxys obtusa*, Pérez.—2 ♂ ♂, Amara (M), 14th-15th June.

One specimen has the first 3 abdominal segments red, in another there is only a touch of that colour at the base of segment 1. (In a ♂ from Gibraltar given to me by E. Saunders the abdomen is entirely black, and it seems to have been so in the specimen described by Pérez.)

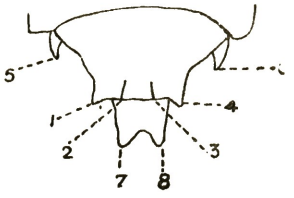

Fig. 8.
96. *Apis mellifera*, L.

The 'teeth' which form the actual apex of the abdomen (Nos. 7 and 8 in the Figure) are very unlike those of *hæmorrhoa* and "*coturnix* (?)."

Instead of being long slender spines, they are short and broad, with broadly subtruncate apices and their inner margins converging rapidly almost at right angles. (All the 'teeth' in this species seem liable to vary somewhat in shape. They are even sometimes distinctly asymmetrical. Notwithstanding this, their general appearance is so far uniform and unlike that of those in *hæmorrhoa* that specimens of the two can always be distinguished at a glance by the characters of this segment only!)

The figure above (Fig. 8) is drawn from the redder of the two ♂♂, and the so-called teeth are numbered as in the corresponding figure (Fig. 6) of the ♂ apex in "*coturnix* ?"

Several specimens were sent by aptain Buxton's from N. W. Persia (Resht, Enzeli, Kermanshah,) but none from Mesopotamia. All were workers, and belonged to the var. *fasciata*, Latr.

List 3, Wasps.

1. *Vespa crabro* L. var. *crabroniformis*, Smith.—1 ♀, Enzeli (P), 25th June.

This specimen is exactly like the Type (at S. Kensington!) of Smith's *crabroniformis* described from N. China as a new species. It only differs from normal examples of *V. crabro* in having very narrow—in fact almost linear—yellow bands on the 3rd and 4th abdominal tergites.

2. *Vespa orientalis*, L.—1 ♀, Amara (M), 25th June.
2 ☿☿, Amara (M), 6th July.
[1 ☿, Amara (M), "from nest in roof of building" 17th August 1918.—Captain Evans.]
1 ☿, Shahroban (M), 31st July.

All these belong to the bright red and yellow typical form of the species.

The darker variety *ægyptiaca*, André, occurred in N. W. Persia (1 ♀, Qazvin, 25th July.)

3. *Vespa germanica*, F.—Many ♀♀ from Persia (Kermanshah, Enzeli, Qazvin, etc.) also 3 ♂♂, Kermanshah, 3rd and 4th December, 1 ♀, Enzeli, 20th June.

No specimens have been sent to me from Mesopotamia, nor is that country cited in the list of Asiatic localities given for *germanica* in R. du Buysson's *Monogr. des Guepes ou Vespa* (1904).

4. *Polistes gallicus*, L.—Many ♀♀ and ♀♀ were taken by Captain Buxton in Persia, but no ♂♂, [Captain Evans also sent a ♀, one of "three found under a stone," 22nd January 1919, from Harunabad (P).] In Mesopotamia the species seems to have been completely anticipated—or evicted ?—by *P. hebræus*. At any rate none have reached me from thence.

It may be that I am including under the Linnean name *gallicus* more than one of several forms which have been separated by Kohl on account of differences in their ♂♂. There are certainly, there as elsewhere, two easily distinguishable types of coloration. Specimens taken at Resht and Enzeli between February and June were much darker and generally larger than others which occurred at Qazvin and Menjil (July-September). But the Harunabad ♀ "hibernating under a stone" in January was of the light form.

5. *Polistes hebræus* (*macœnsis* ?), F.—Of this species Captain Buxton took several ♀ ♀ at Amara (M) between November 1917 and June 1918, and seven ☿ ☿ at Amara and Baghdad (M) during the same period and in July. [Captain Evans found ☿ ☿ later also, *viz.*, in August and September 1918.]

I have compared these specimens with Fabricius's original Type of *macœnsis* in the Banks Collection; and, like it, they are very pale forms with hardly any black markings. In most of them the mesonotum appears quite immaculate.

But I prefer to call them *hebræus* which is the older name, because, after careful consideration of all Fabricius's many descriptions of his *hebræus* and *macœnsis*, I can find absolutely nothing to shew why he thought them distinct. Some authors hold that the two differ in colour, *hebræus* being a darker insect. It is true that some so-called *hebræus* and *macœnsis* specimens differ in this respect. But all the many specimens of both that I have seen appear to be mere individual aberrations from a single specific Type, and both forms certainly occur together in most of their Oriental habitats, together with many others which are intermediate between them. The original descriptions are to all intents and purposes identical; and though Fabricius names one from Palestine (*hebræus*), and the other from China (*macœnsis*,) he cannot have meant to distinguish them as differing in 'habitat.' For he gives "India orientalis" as the habitat of *hebræus*, and "Macao Indiæ" (sic!) as that of *macœnsis*! On the whole I believe that the two names should be treated as synonymous, and that of the two *hebraeus* has "priority" over the other.

6. *Eumenes coarctata*, L.—1 ♀, Qasr-i-Shirin (P), 24th November 1918.

This is the *mediterranea* of Kriechbaumer, the common form in most southern districts. Both *mediterranea* and *pomiformis*, F, are probably only varieties (local races) of the Linnéan species.

7. *Eumenes esuriens*, Pauzer.—2 ♂ ♂, Shahroban (M), 31st July; Amara (M), 17th September.
1 ♀, Amara (M), 9th September.
1 ♀, Kurna (P), 20th May.
[1 ♂, Amara (M), 17th August.
1 ♀, Amara (M), 27th August—Capt. Evans.]

8. *Odynerus simplex*, F.—1 ♂, 2 ♀ ♀, Talish (P), 10th July.

9. *Odynerus parietum*, L.—1 ♀, Qazvin (P), 20th September.

10. *Odynerus melanocephalus*, Gmel.—6 ♂ ♂, 1 ♀, Amara (M), 3rd March to 19th June.

In the ♀ and in four of the six ♂ ♂ the scutellum bears two distinct yellow spots, in another ♂ they are almost invisibly small, and in the June ♂ the scutellum (as in normal *melanocephalus*) is immaculate. (I do not suppose this character to have any systematic significance, but it is as well to mention it.)

11. *Odynerus chloroticus*, Spin.—1 ♂ and 1 ♀, Amara (M). September.
[1 ♀, Beit-Na'ama near Basrah (M), 12th April 1919.—Captain Evans.]

12. *Odynerus crenatus*, Lep. (?)—1 ♂, Amara (M), 28th May.
[1 ♂ "Four miles below Amara, 17th September.—Captain Evans.]

These are very highly coloured specimens, but I think they do not differ specifically from specimens determined as *crenatus* by Professor Pérez.

13. *Odynerus transitorius*, Morawitz.—9 ♂ ♂ and 11 ♀ ♀ of this exceedingly pretty little species were taken by Captain Buxton at Amara and Shahroban (M). [Captain Evans also found it at Beit-Na'ama (M) on April 12th, 1919.] Many specimens, apart from their 'pictura pallida,' were largely or even entirely red. They were flying in April, May and June, and frequented the flowers of an Acacia. [Captain Evans's specimen occurred "about Tamarisk."] The

species as Morawitz has remarked, much resembles the Algerian *blanchardianus*, specially in the peculiar carinated base of the 1st abdominal tergite (the carina distinctly interrupted in the middle!)

14. *Nortonia deceptrix*, n. sp.—4 ♂♂, April; 1 ♂, 28th May; 1 ♀, 14th May, Amara (M).

In many respects, and especially in the form of its 1st and 2nd abdominal segments, this species much resembles one which I described from several ♂♂ taken on February 12th, 1901, at Abba Eiland, by the Swedish Expedition to Egypt and the White Nile (See Ann. and Mag. N. H., December 1903).* This no doubt was also a *Nortonia*, but I wrongly referred it to "Odynerus (Ancistrocerus ?)" and called it *aberraticus*.

The Mesopotamian species however seems to be certainly different from the Egyptian in several characters of specific value. (*a*) The scutellum is transverse and not almost quadrate, (*b*) the excision of the strongly bidentate ♂ clypeus is not triangular, but semi-circular, (*c*) the lateral angles of the pronotum are distinctly subspinose, (*d*) the costæ at the base of the 2nd ventral segments are fairly long, (*e*) the mandibles of the ♂ appear to be simply acuminate and not tridentate.

I notice also that the very coarse rugosities of the mesonotum, when viewed from behind, appear as definite longitudinal strigæ. I do not remember that the specimens I examined in 1903 shewed any such character, and I find no mention of it in the description of Kohl's *N. moricei*.

The scutellum and postscutellum are both entirely yellow in *deceptrix*: the former in the Egyptian species is black, and the latter only shews two small spots of yellow. The colour of the abdomen varies to some extent in the specimens now before me, but in most of them there is certainly more yellow and less black than in the types of "*aberraticus*."

Fig. 9 A.

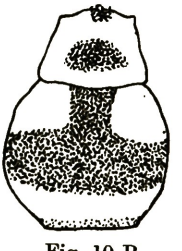

Fig. 10 B.

First and second segments in N. deceptrix.

The accompanying sketches (Figures 9 and 10) representing the 1st and 2nd segments (viewed A *laterally* and B *dorsally*) in the brightest of the ♂♂, will give an idea of this. In the only ♀ there is a larger black triangle on the disc of segment 1, but on its 2nd segments there is more yellow still, the yellow lateral maculæ at its base being all but actually confluent!

The lateral margins of the propodeum are very spinulose throughout, as is also the crest of the postscutellum which resembles those of *O. blanchardianus* and *transitorius*.

List 4. Chrysids.

1. *Hedychrum rutilans*, Vahlb.—1 ♂, Kazvin (P), 17th July.
2. *Hedychridium hilare*, n. sp.—1 ♂, Amara (M), 25th June.

At first sight this might be taken for an extreme variety or aberration of the common *H. roseum*. The colour of the abdomen much resembles that which characterizes the latter, and contrasts in the same way with the prevailing greenness of the head and thorax. But the postscutellum and propodeum (except

* One of the same specimens, or one taken at the same place and on the same day, was described three years later by Kohl in his admirable work on Hymenoptera from South Arabia and Socotra, Wien, 1906, as *Nortonia moricei*, n. sp. He accredits the capture to me, but I never visited Abba Eiland, and was not in Egypt at all in 1901.

its lateral angles) are not green at all, the former being violaceous and the latter testaceous. Again, though in certain aspects the pronotum appears to be green, its real ground colour seems to be testaceous, as is also that of the antennæ, the mandibles, the sides of the face, and the whole of all the legs. The vertex, however, and the tempora are distinctly green, like the mesonotum and scutellum, but there is a slight touch of a warmer colour (reddish-golden) between the ocelli and the compound eyes. Seen from beneath the whole body appears testaceous and polished, except the green mesopleures, and occasional reflections of the same colour playing over the legs which become visible only in certain lights.

But apart from mere colour, it seems to be certainly distinct from *roseum* by more important characters.

(1) The antennæ are shorter and stouter, with joints 2, 3, and 4 subequal but joint 4 slightly longer than the others. (In *roseum*, joint 3 is evidently longer than 4, and fully twice as long as 2.)

(2) The green areas of the thorax are very shining, and their puncturation irregular and mostly very sparse. (In *roseum* the whole thorax is almost opaque, its puncturation being uniform and close.) This difference is apparent even to the naked eye.

(3) The abdomen, especially its basal segment, is also much more sparsely punctured than that of *roseum*, the punctures being everywhere separated by intervals much larger than themselves.

(4) The face, which is bright metallic green in the middle, but testaceous at the sides and below the antennæ, is clothed with very short silvery pubescence, conspicuous in some lights, but in others quite invisible, and not concealing the sculpture of the integument. This is very small and shallow (sub-coriaceous) and contrasts strongly with the much coarser rugose puncturation of the vertex. (In *roseum* ♂ the face is deep-blue, the few hairs on its surface are fairly long but quite inconspicuous, not appearing silvery (so far as I can see) in any aspect, and the integument is punctured very much in the same style as that of the vertex.)

(5) The wings are perfectly clear. (In *roseum* they are distinctly infuscated.)

3. *Chrysis fuscipennis*, Brullé.—1 ♀, Amara (M), 28th October.
4. *Chrysis palliditarsis*, Spin.—3 ♂♂, 4 ♀♀, "on *Acacia*," Amara (M). 10th June.
   2 ♀♀, Amara, 13th-17th June.
5. *Chrysis blanchardi*, Luc.—1 ♂, Amara (M), 6th September.
6. *Chrysis maculicornis*, Kl—3 ♂♂, Amara (M), 10th June "on *Acacia*," 14th June, 18th August.
7. *Chrysis exigua*, Mocs.—1 ♂, Amara (M), April.
   5 ♀♀, Amara, 10th and 13th June "on *Acacia*."
8. *Chrysis ignita*, L.—2 ♀♀, Talysh (P), 18th July.
9. *Chrysis scutellaris*, F.—1 ♀, Amara (M), "on Sunflower" 12th September.
10. [*Chrysis cyanopyga*, Dahlb.—1 ♀, Beit-Na'ama (M), 10th April 1919.—Captain Evans.]

The last 8 species (3 to 10) all belong to the Section "*Tetrachrysis*."

11. [*Chrysis* (*Hexachrysis*) *stilboides*, Spin.—1 specimen taken "at or near Amara," 18th August 1918. I omitted to take note of the sex.—Captain Evans.]
12. *Chrysis buxtoni*, n. sp.—1 ♂, Amara (M), 10th June.

This must also, no doubt, be reckoned as a *Hexachrysis*, though four of its so-called "teeth" only are really tooth-like. The outermost pair are *lateral*, situate one at each end of the series of foveæ. The intermediate pair are *apical*,

these are sharp and spine-like. The innermost pair are merely obtuse undulations of the margin (See figure 11). By its coloration it belongs to the Section known as *Viridis.*

Fig. 11. *Apex of abdomen in Chrysis buxtoni* ♂.

Body above almost entirely bright metallic green, but with a more fiery (reddish-golden) tinge at the sides of the mesonotum, and with the tegulæ deep dark blue. Venter partly concolorous with the dorsum, partly blue, indigo, violet, etc. (the colours blending where they meet, and as in many other species with a pair of large rounded spots (black with violet reflections) at the base of its 2nd segment. Antennæ fuscous, densely clothed with minute, white sub-erect hairs: joints 1, 2, and a part of joint 3, green. Legs green, with yellowish (non-metallic) knees and tarsi. Wings clouded in the middle, but quite clear at base and apex. Face and genæ (between eyes and mandibles), clothed with silvery hairs. Pilosity of dorsal surface short and inconspicuous, but the femora and tibiæ are fringed with rather long pale hairs.

Head about as wide as the pronotum. Third antennal joint about as long as the second and fourth together. Least length of the cheeks about equal to that of the second antennal joint. From near each end of the rather vaguely carinated brow which overhangs the facial cavity a very distinct carina runs backward into the ocellar area, nearly isolating the anterior ocellus from the others. (Fig. 12.)

The apical half of the pronotum is sulcate longitudinally, and its lateral angles (=shoulders) subspinose. The dorsum of the abdomen is evidently but not strongly carinated longitudinally. The head is closely punctured (this is not shewn in the Figure): the thorax and abdomen less so, and much more coarsely (about as in *C. micans*, Dahlb.). On the sides of the mesonotum the punctures are especially large and sparse.

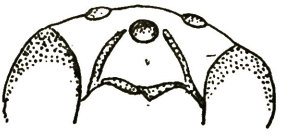

Fig. 12. *Upper part of head Chrysis buxtoni* ♂ *Viewed from in Front.*

Length of body about 7 mm.

[I have not attempted to shew the puncturation of the head, which would have made the 'characters' I desired to illustrate more difficult to see.]

13. *Stilbum cyanurum*, Forster.—One specimen of the typical form was taken "at or near" Amara by Captain Evans. I forgot to take note of the sex.

14. *Parnopes grandior*, Pall. (=*Carnea*, F.)—1 ♂, Enzeli (P), 30th June.

Nearly all the Mesopotamian Chrysids mentioned above occur also in R. du Buysson's List of Egyptian forms (*Mem. Soc. Ent. d'Egypte*, Cairo, 1908.)

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 30, 1920.]

"THE BIRDS OF MESOPOTAMIA."

BY

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Assisted by

P. A. BUXTON, M.A., M.B.O.U., late Captain, R.A.M.C.

and

MAJOR R. E. CHEESMAN, M.B.O.U., 5th Buffs.

(*With two plates.*)

PREFACE

During the late war a number of officers who were more or less interested in Ornithology found themselves in Mesopotamia, and thanks to the help and stimulus given by the Bombay Natural History Society, and especially by their Curator, Capt. N. B. Kinnear, considerable collections and observations were made, while Sir Percy Cox, the High Commissioner, gave great help in many ways.

It has been the aim of the Society to get together all the information available from the various members of the Force, and the collections they made, in order that as comprehensive a paper as possible on the Avifauna of Mesopotamia could be written for the use of present and future British residents in that country, and the Society has asked me to undertake the task of working out the collections and putting together this account, which I have had much pleasure in doing,—ably assisted by Major Cheesman and Capt. Buxton, without whose help this paper could not have been written.

The chief collections were formed by (1) Maj. Cheesman and Sir Percy Cox, (2) Capt. Pitman, (3) Capt. Buxton, while Major Ross, Lt.-Col. Bailey, Maj. Logan Home, Capt. Aldworth, Capt. Harrison, Capt. Armstrong, the writer and others contributed smaller numbers. The first two collections have been presented to the Bombay Natural History Society. Accompanying these collections were a number of observations and field notes, while others contributed also notes of varying amount and value. The list of contributors is as follows :—

Capt. T. P. Aldworth, D.S.O., 3rd W. Kent.
Capt. J. Armstrong, R.A.M.C.
Capt. R. Bignell.
Maj. Logan Home.
Capt. F. Ludlow.
Lt. A. St. G. Macdonald.

Lt.-Col. F. M. Bailey, C.I.E.
Maj.-Genl. Sir F. Brooking.
Capt. Burgess.
Capt. P. A. Buxton, R.A.M.C.
Maj. R. E. Cheesman, 5th Buffs.
Maj. J. Chrystal.
Lt.-Col. F. P. Connor, I.M.S.
Maj.-Genl. Sir Percy Cox, G.C.I.E., K.C.S.I.
Lt.-Genl. Sir R. Egerton.
Maj. Fleming, D.S.O., Trench Mortar Brig.
Capt. W. Graham, R.A.M.C.
Capt. L. Harrison, R.A.M.C.
Capt. Hedgecock, Pol. Dept.
Capt. R. W. G. Hingston, I.M.S.
Capt. R. Hobkirk, 1st Manchesters.
Lt. W. Hyatt.
Capt. C. M. Ingoldby, R.A.M.C.
Capt. T. R. Livesey, Pat. Lancers.
Maj.-Gen. H. D. Keary.
Lt.-Col. H. A. F. Magrath, 51st Sikhs.
The late Maj. G. A. Perreau.
H. St. J. Philby, Esq., C.I.E., Pol. Dept.
Capt. C. R. Pitman.
Capt. G. D. Robinson.
Maj. E. J. Ross.
Lt.-Col. Stevens.
Capt. H. F. Stoneham, O.B.E., 1st E. Surrey.
Capt. C. B. Ticehurst, R.A.M.C.
Lt.-Col. F. E. Venning.
Lt.-Col. F. Wall, C.M.G., I.M.S.
Maj. Wernicke.
Lt.-Col. Sir A. T. Wilson, C.S.I., C.I.E., D.S.O.
Maj. Wimshurst, 5th Buffs.
Lt.-Col. H. S. Wood, I.M.S.
Maj. Watts, 23rd Cavalry.

To all these gentlemen the thanks of the Society are due for their help and co-operation.

The area covered by this paper is roughly from Mosul to Fao and from the Jebel Hamrin range to the Syrio-Arabian desert, and although over this large area there are a considerable number of observations and collections from many places, these have naturally followed the lines of war's progression, and there are parts where it so happened no one of ornithological tastes happened to be, notably on the Euphrates from Nasiriyeh to Hilla and from Feluja to Hit, and again in the North on the line Khanikin-Kifri-Kirkuk-Mosul, little was done, while Major Cheesman and Capt. Aldworth were the only ones to visit the latter city. This paper, therefore, is not and cannot be the last word on Mesopotamian Ornithology, but is intended to be a ground work and book of reference for future workers. Defects and omissions there are bound to be, but it must be remembered that these observations and collections were made during war and often under extremely trying circumstances.

In order to make this account as complete as possible for our area, I have included or referred to anything which has been written in the past on the subject, and a full bibliography (for which I am indebted to the Rev. F. C. R. Jourdain) is appended. During the war a few notes have appeared in the B. N. H. S. Journal and in the "*Field*;"

the latter were chiefly remarkable for the species the authors and no one else ever met with and some of them were, to say the least, highly improbable.

The working up of the notes of various observers has been no simple task ; many notes were made in the trenches, or at least under active service conditions where baggage was reduced to a minimum, and were therefore not presented in a manner which lent themselves to easy abstraction. Furthermore, as was to be expected, many observers saw species which were quite new to them and mistakes in their identification were inevitable. Fortunately the collections contained specimens of the great majority of the birds which are known to occur in our area and so in many cases I have been able to correct wrong identifications ; in other cases however, unless it is extremely probable or known that the species recorded does occur, in the absence of specimens I have omitted them or referred to them in the text. Names of places in the text mean the districts round those places.

In the letter-press it will be noted here and there that I have drawn attention to various points which require further elucidation, and it is to be hoped that any one who has the chance will make special efforts to throw light on the questions raised ; I shall be at all times most willing to give any help or information to, or identify specimens for any one who cares to communicate with me, and I propose from time to time, as new facts accumulate, to add *addenda* and *corrigenda* to the Mesopotamian avifauna in the Journal.

Of each species I have given the English and Latin names and below these, as a trinomial, the names of the race or races of that species which I am satisfied occur in Mesopotamia ; I have also added, as I think it may be of use, the original references and type localities to all, except to those species of which some, but at present undetermined, race occurs. In some cases (*e.g.*, some Waders and Ducks, etc.) for economy of space only the binomial name is given ; either I have considered that no good races occur, or else are so remote from Mesopotamia that any but the typical race is unlikely to occur.

As regards the much vexed question of nomenclature it is now fairly widely agreed to start from the tenth edition of Linnæus, an ill advised procedure which for the time being has put nomenclature into a chaotic state ; even the names of our British species, on which perhaps more study and discussion has taken place than on those of any other area, are not yet finally and indisputably decided on, while in some faunal areas hardly any revision has as yet been attempted.

Therefore it is needless to say that there is no up-to-date list (will any list ever be correct according to the present rules of nomenclature for more than six months after publication ? !) which for our area we can follow. The hunting up of the latest published opinions, scattered throughout the ornithological literature of the world, on what various names should now be, entails more time than is at my disposal and if

accomplished would only produce a list which in a short time would be " out-of-date " again ! However it is to be hoped that the nomenclature here used will at all events be understood by everyone and that after all is the only object of Latin nomenclature.

In working out the collections, I am greatly indebted to the facilities given me by the authorities at the British Museum (Natural History) and especially to Mr. N. B. Kinnear for the assistance he has given me in many ways. My thanks are due to Captains P. A. Buxton and J. Armstrong for the use of their collections, to Mr. Jourdain for notes on Mesopotamian eggs in his collection and to Miss M. Shopland, Miss D. Smith and Mr. F. W. Smalley for kind help in typing the manuscript.

The total number of specimens from all sources available for examination is about 2,500 comprising 241 species out of the 330 species known to occur.

C. B. TICEHURST.

LOWESTOFT, ENGLAND,
March 1*st*, 1921.

INTRODUCTION.

1. GEOGRAPHY.—The Mesopotamian plain, by which we mean that part of Mesopotamia which, between Fao in the extreme south and Fatah Gorge (where the Jebel Hamrin range crosses the Tigris) north of Baghdad, lies between the latter range on the east and the edge of the Syrian desert on the west, is remarkable above all things for its uniformity, or as some might put it, its extreme monotony. As one passes from Fao up the Shatt-al-Arab, there is seen what at first looks like a forest of date palms bordering the river banks ; but where here and there a peep beyond is obtained, one realizes the " forest " is only a belt of trees a few yards up to two miles wide beyond which seems limitless mud desert. The uniformity of the land is essentially due to geological causes ; the whole area is rich alluvial soil and consists of very fine silt brought down through long ages from the highlands of Eastern Asia Minor, Armenia and N. W. Persia. Over the country this silt has been spread to a depth of hundreds of feet and it follows therefore that underlying rocks exercise no influence on either the fauna or the flora. The surface of this alluvial deposit is practically flat except where it has been disturbed by the hand of man. This flatness is so extreme that it must be seen to be realized, but we may mention that the altitude of Baghdad is 112 feet above sea level though its distance from the sea is 360 miles, and Samarra 420 miles from the coast is but 200 feet in elevation ; were the Kew flagstaff to be erected at Fao, the flag would float above the level of the entire Mesopotamian plain. On the very rough quarter inch maps, which were in use during the war, small mounds were marked and their heights relative to the plain, were it only three or four feet, were indicated.

Through this alluvial plain run the two great rivers, the Tigris and Euphrates, with their tributaries, *e.g.*, the Karun in the south and the Dyala in the north, both loaded with silt at the time of the annual high water in the month of April. At this season the water of the rivers tends to overflow the whole country and much of it is led away over the surface of the ground for irrigation ; most of the silt which it carries is deposited fairly near the rivers, and it therefore happens that the land nearest the river is generally very slightly higher than the land further from it. Long ago the waters of the Tigris entered the sea at a place

to-day marked by the ruins of the Median Wall between Beled and Samarra and now over 400 miles from the coast. The old estuary of the Euphrates would be about the same distance while that of the Karun was in the vicinity of Ahwaz. As the rivers raised the level of the delta, the sea was gradually forced back. In Assyrian times it is supposed to have reached Ur of the Chaldees on the Euphrates and to Amara on the Tigris ; since then it has receded another 180 miles to Fao. The rivers when in flood, still rise above the level of the whole area and are kept more or less in their course by artificial banks.

In many parts there is fertile soil right up to the river banks on which wheat and barley are grown, while the cultivatable area could by a scientific irrigation be enormously extended. In places where the cultivation has lapsed for many years, the river banks may become covered with an almost impenetrable jungle consisting of Acacia (*Prosopis stephania*) and Liquorice (*Glycerrhiza glabra*) waist high with bushes of Tamarisk (*Tamarix*), Poplar (*Populus euphratica*), Tea-tree (*Lycium europœum*) and Bramble (*Rubus. sp.*). Similar jungle grows on one or two islands, especially that at Kharadah below Baghdad. Close to the river where water is abundant date palms (*Phœnix dactylifera*) are cultivated over large areas ; there are also extensive vegetable gardens near towns which are planted with figs, apricots, peaches, apples, pomegranates, mulberries, limes and occasionally oranges.

In many parts of Mesopotamia, if one travels ten miles from the Tigris or Euphrates or one of the main effluent irrigation canals, one comes to parts which lie below the level of the corn land by a few feet. Such land is often temporary marsh and is quite dry and sunbaked by mid-summer. There is no boundary between these temporary marshes and the permanent ones, many of which contain huge areas of water which remains two to three feet deep all the year round, and grow crops of rushes and tall reeds ; such marshes are the Hor Hawaize, parts of the Hamar Lake and the swamp at Nejef, while these at Suweikieh and Akkakuf and many others partake of a more temporary character.

Certain areas are low-lying but have no natural drainage ; some of these patches are only a few acres in extent and are only " low-lying " by a few inches, others are much larger. In either case, flood and rain water accumulates here and evaporates, and gradually becomes salter and salter ; at some seasons they are quite white with a saline incrustation. Some of these patches are completely devoid of vegetation, in others the succulent bush (*Sueda monoica*) grows freely.

Parts of the Mesopotamian plain, which are beyond the present reach of water and so practically devoid of vegetation in the summer months, may be said to consist of bare flat mud desert, and no stones or gravel are found in the plain proper.

About 50 miles above Baghdad the aspect of the country changes somewhat and one leaves the plain proper at the Median Wall. At 120 miles from Baghdad, the Jebel Hamrin range crosses the Tigris which passes through the range at Fatah Gorge. Between here and Mosul (our limit in this paper) is an undulating plain (700 feet) of gravel and stones covered with grass in the spring, and here and there along the river are cliffs 100 feet or so in height, similar to those which are also found between Samarra and Tekrit. The ground now rises more quickly and alluvium gives place to lime stones, gypsum, gravel and rocks. Lying above the highest river level, the land cannot be irrigated ; a certain amount of " daim " or rain fed cultivation however is carried on in the depressions where drought resisting wheat and barley are grown and obtain a small amount of water in addition to the actual rainfall from the shelving sides of the small hills. The low table land after winter rains is covered for a short period with grasses and flowers such as scabius, iris, delphinium and wild holly-hock, and is grazed over by the herds and flocks of roving tribes.

2. Climate.—The average annual rainfall is six inches, which is confined to the months of December to April. The shade temperature rises to 120° or more

in July, and in January twelve degrees of frost have been registered. On the whole, one may say that the climate from November to April is well nigh perfect, and from May to September the reverse. The Shumaal or north wind commences to blow about the end of May and continues into July ; it is welcomed as modifying the hot days but causes a certain amount of dust storm. Snow is not known in the plains but hail storms occur especially in spring. The tops of the Pusht-i-kuh Mountains hold snow till about May and are visible from the Tigris from Amara to Kut.

Tracing the Jebel Hamrin, a sandstone range, to the south-east, we find it forms a more or less continuous line of hills to Ahwaz and form as it were foothills to the great Pusht-i-kuh Mountains and also the eastern boundary of the Mesopotamian plain ; this range runs up to 700-800 feet, while the Pusht-i-kuh Mountains, which are outside our area, run up to about 9,000 feet. The latter, however, exert a certain amount of influence on our area as not a few of the winter visitors to the plains pass the summer there and in the high table land of Persia which is cooler and better supplied with vegetation. The Jebel Hamrin range depends for its beauty on its colouring and except for a short period in spring, it is destitute of vegetation. It is a rugged country of hills and vales and includes the oil-fields at Maidan-i-Naptun on the east of the Karun.

3. DIVISIONS.—Although the Mesopotamian plain is so flat and uniform, it may, for purposes of zoo-geography and more particularly for the information of residents in the country, be divided into eight sub-divisions with three more outside the plains.

1. *The Seacoast and mud banks at the mouth of the Shat-al-Arab at Fao.*

A certain amount of information about the ornithology of this district was supplied by Mr. W. D. Cumming during his residence there in the eighties, but very little collecting was done there during the war and no description of the place has been given. There are enormous areas of swampy grass and mud banks more or less covered by high tide and probably many creeks and islets. In winter it is, of course, the happy hunting ground of vast numbers of Waders, Gulls, etc., while here the Pelican and Flamingo breed and the Reef Heron is resident. Of particular interest is the Khor Abdulla or Abdulla Banks. Armstrong, who while at Fao made enquiries concerning them, states that they are a group of rocks situated on the Arabian side of Fao and about 15 miles distant. They lie in an old channel of the Shat-al-Arab surrounded at low water by vast mud-banks, while between them there is a certain amount of silted mud and sand. It must be a big breeding ground certainly of the Crab Plover, while the Spoonhill, Pelican Reef Heron and perhaps other Herons are said to nest there. No Englishman has apparently visited them, except the Superintendent, Telegraphs, at Fao from whom this information is derived.†

2. *The edge of the Syrian and Arabian desert which lies on the right bank of the Euphrates and Shat-al-Arab.*

This consists of a sandy and gravelly table land gradually rising from 30 to 2,000 feet in altitude towards the centre of Arabia. This table land is very bare excepting in the spring and has very few birds ; on migration, however, a fair number of birds visit such oases as exist as at Shaiba. Here occur as typical denizens the Bifasciated Lark (*Alœmon*), the Finch Lark (*Pyrrhulauda*) and a Desert Lark (*Ammomanes*).

3. *Permanent marsh and reed areas, and temporary marsh.*

The Hamar Lake, Horr Sanef, Howaiza marsh are formed by the continuous overflow of the Euphrates, Tigris and Kerkha rivers into vast depressions just above tidal influence in the Kurna district are the most important of these in the south, and the Euphrates marshes round Museyib and the Nejef swamps in the middle of the plain. In winter, countless myriads of wildfowl immigrate here.

† Sir Percy Cox has visited these Rocks several times and the Society's Collection contains skins and eggs from there presented by Sir Percy. A note of these is being sent to Dr. Ticehurst : Eds :

The most frequently seen are Tufted Duck; the Grey Lag and White-fronted are the common geese, while the Heron tribe is very well represented with Goliath Purple, Common, Night and Squacco Herons, Bitterns, Little Bitterns, Egrets, Ibis, etc., and Coots, Purple Gallinule, etc., swarm. In summer it would seem to be ornithologically not so interesting. Buxton travelled by canoe twice for two days across the Hor Hawezeh in July, and saw comparatively few birds. For two days he passed through gigantic beds of reeds, many of them 18-20 feet high, intersected by narrow channels of clear water, six feet deep in places; there were no small birds in the reeds except close to land, where the Moustached Sedged Warbler was common, and the larger birds seemed to consist of nothing but Purple Coots, Pigmy Cormorants, Goliath Heron and Darters, but doubtless there were a few others such as Marsh Harrier and Purple Heron as in other lakes, and there is a certain amount of evidence that a few Grey Lag remain to breed, as certainly does the Marbled Duck, while in the Euphrates marshes around Museyib, the Avocet, Whiskered Tern and Black-necked Grebe, etc., nest.

Temporary lakes are frequently formed by the spill of the rivers in flood such as at the Umal Brahm and Akkarkuf, etc. These are large open sheets of water affording a haven in winter for water fowl and waders generally, but under the influence of the spring sun, dry up quickly and on the receding mud waste, Common and Lesser Terns, Kentish and Little Ringed Plover and White-tailed Lapwing breed in numbers; the Stilt on the more swampy parts.

4. *Date and Fruit Gardens.*

These are the haunts of the tree loving species to which in Mesopotamia, little alternative exists. Among the resident birds are the Wood Pigeon, Persian Crow, Indian Ringed Dove, Babbler and Bulbul, while the Indian Roller is restricted to the Shat-al-Arab area. In winter come the song Thrush, Persian Robin, Isabelline Shrike, *Phylloscopi*, etc., while the tall date palms are resorted to for roosting by countless Rooks, Starlings, Black Kites and Night Herons. In summer come to breed the Olivaceous Warbler, Nightingale, Grey-backed Warbler, Persian Turtle Dove and Yellow-throated Sparrow (*Gymnorhis*), etc., and many passage migrants halt here. One day every bush is full of *Phylloscopi*, another every pomegranate bush holds Woodchat or Red-backed Shrikes or the bean fields are full of Great Reed Warblers.

5. *The Corn Lands.*

In winter, this is the haunt of Rooks, Jackdaws, Stock and Rock doves which feed on the newly sewn corn; the Crested Lark is ubiquitous and resident; Sky, Wood and Short-toed Larks, House and Spanish Sparrows are to be seen in flocks in winter while the Pallid Harrier and Kestrel particularly affect this type of country. As the corn grows high, various migrants may here be found such as the Sedge Warbler, Lesser White-throat, etc. During irrigation in winter and early spring, numbers of Wagtails and Meadow, Water and Red-throated Pipits haunt the wettest parts.

In the summer, after harvest, the Large Pin-tailed Sandgrouse in immense numbers, and the Spotted Sand Grouse in small numbers breed in and round the corn lands.

6. *The Rivers and low Scrub Jungle along the banks.*

In winter, the White Wagtail, Green Plover, Green and Red Shanks and Common Sandpiper are among the familiar winter visitors, while the Common, Pied and White-breasted Kingfishers, Red-Wattled Lapwing are resident and breed. In winter too, many Gulls (*L. cachinnans* and *ridibundus*) may be seen far up the river inland, as well as Gull-billed, Little and Caspian Terns, while among the ducks, the Smew and Golden-eye seem to show a predelection for the rivers themselves.

In the scrub and scrub jungles which only exist in the vicinity of rivers and canals, the Black Partridge or Francolin is a characteristic bird, as also are Menetries Warbler, Streaked Wren Warbler, and here and there (as a summer visitor) the Grey Hypocolius and Scrub Sparrow, while in winter, these last are joined

at roost by hordes of Spanish Sparrow. Here, too, in winter may be seen Blue Throats, Robins, Black Redstarts, etc., and the few Finches which occur, such as the Goldfinch, Chaffinch, Eastern Linnet and rarer still the Red-fronted Finch (*Metaponia*) and Crimson-winged Bullfinch (*Rhodospiza*).

7. *Uncultivated land beyond the irrigated area.*

The dwellers in this desolate region are few; MacQueen's Bustard breeds there while the Norfolk Plover and Cream-coloured Courser have been seen in the breeding season in pairs, and almost certainly breed. Here, too, may be found the Pratincole in colonies, while the Blue-cheeked Bee-eater makes its burrows into the flat surface, choosing places with a sandy subsoil. In winter a few Eagles Long-legged Buzzards, odd Isabelline and other Wheatears and occasionally the Desert Warbler are almost the sole occupants to be seen on a long day's journey.

8. *Towns and Buildings.*

The House Sparrow must take premier place and is a resident everywhere. The White Stork nests on the houses and mosques in Baghdad and northwards. The Barn Owl is a local resident, while the Kestrel and probably also the Lesses Kestrel utilize suitable buildings. The Eastern Swift (*C. murinus*) breeds in most of the larger towns. The Swallows are summer visitors and breed in most of the houses, while their nests built on the tent poles were an annual feature of the canvas camps. The Rock Dove inhabits the towns and ruins, such as at Ctesiphon, in numbers, and enjoys an immunity from persecution from the Mahomedans by living in the sacred mosques; the flocks of unmixed blue are one of the beauties of Baghdad and it is hoped it will be long before the nondescript breeds of the fancier appear and convert them into the mongrel pigeon communities usually seen.

This concludes the subdivisions of the great alluvial plain; above this and always above the highest level of the rivers we have :—

1. *Undulating table land.*—Here on the rolling plains of gravel and grass such as between Fatah Gorge and Mosul, the Calandra and Short-toed Larks which spread out in winter to lower parts, retire to nest; in suitable spots the Desert Lark (*Ammomanes*) is resident. In the cliffs where the river has cut its way through the hills of conglomerate rocks, Bonelli's Eagle, Long-Legged Buzaard, Egyptian Vulture and Raven breed. The See-See (*Ammoperdix*) is not uncommon on the rougher ground, and is, of course, resident.

Here, too, is one of the breeding places of the Brahminy Duck. On the vast grassy plains, the Great Bustard is to be met with round Kirkuk and Mosul and was not uncommon when these places were first occupied.

Correspondingly similar places are to be found at Shahroban on the Diala, at Ahwaz on the Karun, and somewhere above Feluja on the Euphrates.

2. *Foothills of the mountains* 900—1,500 *feet from Mosul to Ahwaz*—Cheesman and Buxton were about the only observers who visited these rugged hills and they found very few species there but as might be expected a few species occur there which are not found elsewhere, the Red-rumped Swallow and Rock Nuthatch were apparently resident as also is the Chukar in suitable places, while Hume's Chat was also obtained here. The Pusht-i-kuh Mountains are outside our area; they include the Zagros referred to by Zarudny.

P. A. B.

R. E. C.

4. Migration—A feature of the avifauna of Mesopotamia is the small number of resident species in contrast to a long list of migrants and winter visitors. In fact one might mention places where there is but one resident—the crested lark. During the spring and autumn migrations, even these desolate spots are thronged with bird life undertaking the great pilgrimage, either staying a while to rest or feed, or merely passing over. The small oasis, such as Shaiba, on the edge of

the Syrian and Arabian deserts, provide more favourable opportunity for bird migration study than would a much frequented island in mid-ocean, to which the oasis in a reverse sense corresponds. The few tall tamarisk or palm trees can be seen for long distances across the thirsty sand-waste and promise shade and a refresher at the wells. Here taking advantage of the scantiest vegetation or shelter, the most unexpected species in such a region were encountered, as land-rails, moorhen and the nightingale; next day these had departed, their place being taken by wagtails, flycatchers, cuckoo, blackcap and white-throat, and so in even changing procession until the last one had passed and the small plantation settles down to its normal aspect—the home of a pair or two of crested larks.

Mesopotamia lies in one of the great migration routes of the Palæarctic birds (a geographical division of the bird kingdom to which the English birds also belong). This division roughly comprises Europe and N. Asia. The Southern boundary line passes along the Persian coast and at Fao strikes across the Syrian desert to the Gulf of Akaba. Most of Arabia at all events, is in the Ethiopian or African region.*

Palmen suggested several routes by which most Palæarctic birds travel to and from their summer quarters. It is only necessary to give one here, but as a matter of interest we will include route A which "leaving the Siberian shores of the Polar Sea passes down the west coast of Norway to the North Sea and the British Isles" thence through France and Spain to Africa, in some cases far south in Africa. The route affecting this paper is route D, Starting from the extreme north of Siberia it ascends the river Ob and branches out near Tobolsk, one track diverging to the Volga, descends that river and so passes to the sea of Azov, the Black Sea and thence by the Bosphorus and Aegean to Egypt; another track makes for the Caspian by way of the Ural river and so leads to the Persian Gulf. The latter branch is that which passed twice a year over the Mesopotamian Expeditionary Force, mostly following the line of the three large rivers, Tigris, Euphrates and Karun, though doubtless many birds also make their way through the valley and passes of the mountains of Kurdistan and Luristan.

During the war, our stay in any one locality was always brief, our own migrations were frequent and time was occupied in other directions and so our knowledge of migration is too scanty to do more than roughly indicate what possibly happens. However our observations at the oasis of Shaiba led us to believe that these birds which leave Mesopotamia for the winter pass on into Arabia and most of them presumably cross the Red Sea to find winter quarters in Africa. The centre of Arabia is unfortunately terra *incognita* ornithologically. The normal autumn migration at Shaiba was moving in a south to south-west direction and if these courses were held they must either go straight across Arabia or possibly strike the Persian Gulf somewhere near Koweit and perhaps coast along before striking across this continent. An exception to this general direction was noticed at Shaiba in the case of the yellow wagtails, flocks of which were seen on several consecutive days flying low over the desert in a *North-easterly* direction which would bring them to the Shat-al-Arab near Busra. The only explanations of this

* Where one should draw the boundary of the Palæarctic and Ethiopian regions cannot be determined as yet, until the fauna of Central Arabia is known and that of the Arbian shore of the Persian Gulf. Palestine, in spite of its few Ethiopian forms must certainly be considered Palæarctic and so must Sinai; Hedjaz and Yemen on the other hand partake of an Ethiopian character. Mr. H. St. J. Philby, C.I.E., who has recently visited the Washm Province of Central Arabia informs me that he met with a grey Partridge there, probably *Francolinus pondicerianus*, an exceedingly interesting fact, as hitherto it was only known from Mascat in the Arabian continent. Mr. Philby knows the Black Partridge and See-See well and is quite certain his birds were not these.—C.B.T.

would seem to be that having " made " the oasis of Shaiba and found nothing but limitless bare desert beyond, they had decided to make the river again and coast on up the Gulf and cross inland elsewhere.

Besides the general north to south, south to north migrations there must be, we think, with some species, an east and west migration and *vice versa*, by which such species as the Blackheaded Bunting and Rosy Pastor reach their breeding grounds but details of this we know little of. There are, of course, too many local migrations as with the Pintailed Sand Grouse, which probably are influenced by food supply, and those of the Gullsand Terns moving to their breeding grounds.

It should not be inferred, of course, that the majority of birds make the complete journey from the far north through Mesopotamia to Africa ; comparatively few attempt this, and our migrants may be roughly grouped into the following divisions :—

A. There are some which breed in the far north and in winter come no further south than the Caspian ; as example of this is the Redwing.

B. Others nesting north of Persia come further south and winter in Mesopotamia such as many of the ducks and waders, some of the Pipits, the Short-eared Owl, Siberian Chiffchaff, and Dark-backed Herring Gull.

C. Others nesting north of Persia are passage migrants through Mesopotamia and winter in Africa such as many of the Cuckoos, Swallows, Warblers, Wagtails.

D. Another group nesting in Persia merely descend to the Mesopotamian plains to winter, among them are the Imperial Sand Grouse, Wheatears of several species, Persian Robins, Sharpe's Crow, Black Kite, Griffon, Vulture, etc.

E. Another group are summer visitors to Mesopotamia and go in some cases hardly north of this, and winter in Africa, such as the Blue-cheeked Bee-eater.

R. E. C.

5. Character of the Avifauna—This is undoubtedly Palæarctic, the majority of the breeding species belonging to Palæarctic *genera*, such as *Ædon, Hypolais, Sylvia, Passer, Pica, Acrocephalus, Melanocorypha*, etc., but a few Indian species have spread west along the Persian Gulf as far as Mesopotamia, such as *Coracias benghalensis, Pycnonotus leucotis, Prinia lepida, Porphyrio poliocephalus, Gymnorhis flavicollis, Sarcogrammus indicus, Gallinula c. parvifrons.* In winter and on the migrations, Mesopotamia is the meeting ground of East and West ; thus we may find *Phylloscopus collybita, tristis*, and *trochilus* all frequenting the same bushes; *Calandrella minor minor* and *m. heinei* associating in the same flock ; *Phœnicurus phœnicurus* and *ph. mesoleuca ; P. ochruros* with *phœnicuroides ; Saxicola r. rubicola* with *maura ; Turdus merula syriacus* with *intermedius ;* while *Streptopelia turtur arenicola* comes to breed, *S. t. turtur* is a passage migrant through the country. So too one finds different races passing through to reach their different breeding grounds in the north, such as *Motacilla f. thunbergi* in the far north, *campestris* and *dombrowskyi* to further south of this and so on. Here too in Mesopotamia probably is the meeting ground, roughly speaking, of the breeding areas of some closely allied races, as of the Blue Rock Thrush, See-See, Little Owl, Swallow, etc., but details of this cannot yet be worked out.

On the other hand Africa supplies a few birds such as *Th. æthiopicus, Plotus rufus, Ceryle rudis* while *Phyrrhulauda frontalis, Dromas ardeola, Alœmon alaudipes, Podiceps capensis* and *Pterocles lichtensteini* are Indo-African species.

Of widely distributed species it will be found generally that it is an eastern race which visits Mesopotamia in winter and on passage, and besides receiving migrants from Persia and the far north many must come from far more eastwards

such as *Alauda dulcivox, Anthus s. blakistoni, Calandrella m. heinei, Caprimulgus e. zarudnyi, Falcoæ. pallidus,* etc., while there is no definite evidence of any coming from the far north-west.

As one might expect from the character of the country some genera and families are well represented while others are not, thus the Gulls, Terns and Waders are to the fore, as also are the desert birds, while Shrikes, Larks and Wheatears can claim at least eight forms each ; Woodpeckers, Creepers, Tree Nut-hatches are as to be expected quite absent and of the Tits one species is found in one corner only and another (*Anthoscopus*) is a rare visitor. It is somewhat curious considering the abundant food supply during the war that Vultures should be so scarce ; only two species occur with any regularity and then not commonly.

Part of Mesopotamia has, of course, only emerged from the sea within historical times as already explained, but it is somewhat remarkable that so few forms have segregated out into recognizable geographical races more or less peculiar to the country and it shews what a long period of colonization is necessary sometimes for differentiation to take place, thus the *Prinia, Pica, Sarcogrammus Porphyrio, Alœmon, Crateropus caudatus, Coracias benghalensis* and probably the *Cisticola* are in no way differentiated from the Indo-Baluchi forms, while the *Ammomanes, Passer domesticus* and *Passer moabiticus* are in no way separable from the Palestine forms. Of European forms we have *Sterna minuta, Hirundo rustica, Riparia riparia, Ægialitis curonica* and *alexandrinus* and *Hypolais, elœica* but most of these are of wide distribution and great migrants. So far as we know, the only species which have segregated out into recognisable races are *Ammoperdix griseogularis, Francolinus vulgaris, Corvus capellanus, Alectoris græca* and *Pycnonotus leucotis,* but the last two are not entirely confined to Mesopotamia, while the only *species* entirely peculiar to the country are *Acrocephalus babylonicus* and *Crateropus altirostris.*

Altogether one may say that Mesopotamia has an avifauna of peculiar interest, and that in spite of the opinion of some, in few places does the study of geographical races tend to throw so great a light on the components of an avifauna as here. Is it of no interest to know whence the migrants come and from what direction these plains have received their now resident species?

Two districts call for special comment ; Urfa in the far north-west and the Karun district in the south-east. I have included all species noted at Urfa by Weigold for comparison, though it is beyond the area proper dealt with in this paper, and it is of interest as shewing apparently the western limit of some species on passage, such as the Wood and Bonelli's Warblers, the Collared Flycatcher, etc. and, taking the determinations of his racial forms to be correct, the western limit of some races which in our area are represented by more eastern races ; as these are fully noted in the letter-press they need not be detailed here.

As regards the Karun district we have only the bare statements of Zarudny concerning the status of the various species found there ; these I have alluded to where necessary, but it is to be noted that in many cases the status he gives does not agree with those given by our observers in lower Mesopotamia, in that he frequently records a species as a winter visitor of which we have no records in winter at all. Future investigation is necessary to shew whether some of the these, which otherwise are not known to winter north of Africa do find the Karun district tempting enough to stay their passage further south or not. Several other species are included on the strength of Zarudny's records alone, not having been so far met with elsewhere ; I do not of course vouch for Zarudny's statements.

It may perhaps be of some interest to give a list shewing the approximate status of the species in each order ; our present knowledge does not admit of an exact list and of course some species might be placed in more than one category.

I have placed each species in what appears to be the predominant category and only one race where more than one occurs is included.

	Res.	W. Vis.	Sum. Vis.	Pass Mig.	Strag.	St. incog.
Passeres	24	43	9	40	3	14
Piciform	4	..	3	6	1	4
Strigiform	4	2	..	..	..	1
Accipitriform ..	5	15	1	3	2	5
Palecaniform ..	2	1	..	..	..	2
Anseres	3	17	..	1	2	..
Phœnicopteriform..	1	..	..	..	..	..
Ardeiform	6	3	..	..	1	7
Gruiform	..	2	..	..	..	..
Charadriform ..	10	28	2	2	2	7
Lariform	6	6	2	..	..	2
Podicipiform ..	2	1	..	..	..	..
Ralliform	3	3	..	2	..	..
Columbiform ..	3	1	1	..	1	..
Pterocleiiform ..	2	1	..	..	..	1
Galliform	3	..	..	1	..	..
	78	123	18	55	12	43

C. B. T.

1. Raven. Corvus corax.

Corvus corax laurencei, Hume (Lahore to Yarkhand, p. 335, 1873 —Punjab).

The Raven is at the most a local migrant in Mesopotamia. It is fairly common and nests in the Jebel Hamrin range from Ahwaz in the south to at least Baiji, and probably further, in the north; it also breeds on the river cliffs of the Adhaim and the Tigris from Samarra to Baiji. Logan Hume noted it building at Tekrit at the end of January and Aldworth found nests of seven and three eggs in the first week of March at the same place; Cheesman saw young being fed in the nest on April 18th at Baiji.

In winter the Raven wanders out into the plains but is only found apparently at such places where the hills are no great distance away

Thus there are no records from the Euphrates and none from the Tigris south of Ali Gharbi, at which place the hills are only some 15 miles distant. Here and at Sheik Saad it is fairly common in winter frequenting in pairs the old battle fields, at Kut it is scarce and from Kut to some way north of Baghdad it appears to be absent, this stretch of the river being 60 miles or more from the hills.

Four specimens examined: ♀, Sheik Saad, 22-12-16; Baiji, 18-4-19 (P.Z.C. and R.E.C.). ♂ ♀, Ali Gharbi, 14-11-17 (P.A.B.).

The Mesopotamian birds agree well with the Indian ones, wings 427-440 mm.; bill 71-80, greatest height 27-29·5 mm.

In worn plumage they become very brown and might be mistaken for *C. ruficollis*.

Weigold records this race also from Urfa and Zarudny from the Karun district.

[The only record of *C. ruficollis*, the Brown-necked Raven, is that of a skin in the B. M. labelled Mesopotamia from either Loftus or the Euphrates Expedition. Mr. Kinnear, who kindly hunted up this skin and examined it for me, says that it is a very worn specimen of *laurencei*. Statements received concerning the occurrence of this species require verification and until specimens are forthcoming I include it in square brackets.]

2. Hooded Crow. Corvus cornix. "Ghrabi."

1. *Corvus cornix sharpii*, Oates (Fauna Brit. India Birds, 1, p. 20, 1889—Siberia).
2. *Corvus cornix capellanus*, Sclater (P.Z.S., Lond., 1876, p. 694, tab. LXVI—Head of Persian Gulf).

(1) Sharpe's Crow is a winter visitor to the Mesopotamian plains from the Persian highlands; its time of arrival and departure were not reported on and, as by some observers this bird was mixed up with the resident bird it is somewhat difficult to elucidate its distribution. It has been noted at Shush and on the Karun and Kerkha rivers in March by Woosnam and is recorded as a winter visitor in this area by Zarudny and at Basra by Tomlinson; but most observers agree it is a rarer bird everywhere than *capellanus* particularly so in the lower parts of the plain; thus Buxton met with it but seldom at Amara and it was apparently not common at Nasariyeh. Round Baghdad however it is plentiful and is reported from the Euphrates as far north as Ramadi, but on the Tigris there are no records north of Baghdad except from near Shahroban. Weigold records that a crow nests at Urfa, near the Syrian boundary, which, he says, is somewhat dark for *sharpii* but paler than *cornix*. This crow joins up with the flocks of the resident bird in winter.

(2) I am inclined to regard the resident crow of the Mesopotamian plains as a subspecies of the Hooded Crow and not as a separate species as it clearly replaces *sharpii* as the breeding crow of the plains, whereas the latter is also clearly the breeding bird of the Persian highlands.

The Mesopotamian Crow is resident throughout the year and its distribution would appear to be practically that of the date palm.

It is found from Fao up the Karun river to Ahwaz, Dizful, Shuster, Bund-i-kir and down towards Bushire; but Woosnam noted that as soon as the plains were left behind its place was taken by *sharpii*.

Passing up the Tigris it is common wherever there are palms to Baghdad and up the Euphrates to Museyib, beyond which town it seems to be scarce as Pitman only knew of one pair at Feluja. North of Baghdad on the Tigris it is said to be common in the gardens on the Diala river and near Sindia and it is not uncommon as far north as Samarra and Tekrit, beyond which there are no

records. Weigold does not include it for Urfa, nor Meinerzhagen and Sassi for Mosul.

This Crow is an early breeder ; Cumming says it breeds at Fao from February 15th to March 31st and Tomlinson found eggs on March 4th, and Aldworth several nests in the Nasariyeh district in the first week of March. The top of a tall date palm would appear to be the almost universal site, but Logan Home noted a nest at Amara in a low willow tree about 15 feet from the ground. The full number of eggs is 4 to 5. A nest examined by Buxton was a very untidy affair built of camel thorn and lined with sheeps wool and old paper. Mr. Jourdain informs me that the average of 43 eggs in his collection is 44·05×29·22 mm., and maximum 49·5×29·2 and 48×31·3 ; minimum 42·1×28·6 and 41·1×27·6 mm. ; there is considerable variation in size and some would pass for Raven's eggs while others are no larger than Rook's.

Their habits would seem to be much like those of Crows elsewhere, and they are very fond of marshes and the vicinity of human habitation, doubtless for what they can pick up ; Pitman notes that they are inveterate egg thieves, and will drive Rooks off any morsel they covet ; in absence of any better perch they will alight on tall reeds to which they cling like ungainly huge Reed warblers ! Their note struck me as being harsher than that of the European Hooded Crow, and they have another deeper and gruffer note which I do not remember in the latter bird.

In worn plumage the mantle of the Crow is a creamy white and the newly moulted feathers are very pale grey.

(1) Amara, 30-1-18 ; Baghdad, 13-12-18 (P. Z. C. and R. E. C.).

(2) Five specimens examined : Akkarkuf, 2-8-17 ; 25-7-17 (P. A. B.); ♀, Basra, 12-5-17 ; ♀, Mohommerah, 29-3-17. (♀, Amara, 21-1-18. (P.Z.C. and R.E.C.)

This has the same wing formula as *cornix* 2nd primary between 6th and 7th, the 1st between 9th and 10th. *Scapulatus*, I may note, has quite a different wing to the *cornix* group, a much shorter 6th primary so that the 2nd is between the 5th and 6th and 1st equals the 8th.

Besides being noticeably paler than *sharpii, capellanus* has a larger bill and stouter feet.

3. Rook. Corvus frugilegus.

Corvus frugilegus, L. (Syst. Nat. Ed. X, p. 105, 1758—Sweden).

The Rook is an exceeding common winter visitor to the plains of Mesopotamia arriving with great regularity during the third week of October and continuing to arrive till the middle of November.

Its distribution is much influenced by the presence or absence of trees and cultivation, but it may be said that in suitable places it occurs from Mosul on the Tigris, and Ramadi on the Euphrates in the north, to Fao and the Karun district in the south.

The huge flights to and from their roosting quarters, evening and morning, at some places such as Basra, Amara, and Kazimain must have struck the least ornithologically observant.

In some gardens they roost in such masses that their droppings constitute an annual top dressing much appreciated by the more intelligent land-owners. Flying in to roost, at a fair height as a rule, a strong wind adversely affects them, and Buxton noted that under such conditions they start to come in much earlier and finish later, while they fly close above the ground.

Though a few depart as early as mid February the main migration does not begin till mid March and continues on through that month till the end of April, by which time all have gone. The direction is mostly north in spring and south or south-east in autumn.

Whether any Rooks breed regularly in Mesopotamia is doubtful, but Aldworth in 1919 found an isolated colony at Mosul.

Nine specimens examined : Amara, 10-12-17, 30-1-18, 17-2-18, 29-11-17, 13-1-18 (P. A. B.) ; ♂, Bagdad, 24-12-18 (two) ; ♂, Sheik Saad, 22-3-17. (P. Z. C. and R. E. C.) ; Samarra, 28-2-18 (C. R. P.).

I have compared these with a series of European birds and a series of Eastern ones (India, Turkestan, etc.), the so-called *tschusii* of Hartert, and I must confess that I can see no constant difference between any of them and I am again led to the conclusion as before (*see* Ibis, 1916, p. 41) that the differences are not constant enough to warrant the separation of *tschusii*.

4. Jackdaw. Corvus monedula.

Corvus monedula collaris, Drummond (Ann. and Mag. Nat. Hist. XVIII, p. 11, 1846—Macedonia).

There is not much on record concerning the Jackdaw in Mesopotamia.

According to Logan Home it is resident and breeds in the high cliffs in fair numbers below Tekrit, where he saw them building at the end of February and evidently nesting early in May. Ludlow noted them entering holes in cliffs at Khan Bagdadi in April, and they breed at Hit. Cheesman saw them at Tekrit on April 19th feeding on young locusts, but does not mention anything as regards nesting.

Meinertzhagen records large flocks at Mosul in winter. Elsewhere a few are occasionally met with amongst rooks in winter as at Amara, Kut, and Baghdad. Buxton found it to be common in November on the Jebel Hamrin near Shahroban. South of Amara there are no records but it nests in the Zagros Mountains and Persian highlands. Weigold met with it twice in April in the Urfa district.

One specimen examined : Shah Roban, 22-11-18 (P. A. B.).

The white neck band is very variable and in birds of one year old it is only indicated as a spot on each side of the neck, little more than is found in some specimens of the typical race.

5. Magpie. Pica pica. "Aq Aq"

Pica pica bactriana, Bp. (Consp. Av. 1, p. 383, 1850—East Persia).

The distribution of the Magpie in Mesopotamia is rather curious ; starting at Hilla on the Euphrates it is common and resident wherever there are suitable gardens and date groves, as far north at all events as Ana, where they are numerous ; round Baghdad it occurs but sparingly, and below the city on the Tigris it is absent ; on the Diala river it is found at Bakuba, Shahroban and Kizil Robat.

The Samarra-Tekrit area is unsuited to it but it is found again at Mosul. Wherever it occurs it probably breeds ; Pitman records it breeding at Feluja on March 19th and young in the nest were found there on April 28th ; at Museyib it was one of the commonest garden birds, many young ones being seen in June.

Three specimens examined :Hilla, 16-3-19 (two) (P. Z. C. and R. E. C.); Museyib, 12-7-17 (C. R. P.).

These have a very distinct white rump band and the black on the primaries very restricted, the only specimen with a perfect wing, a male, measured 210 mm. These birds exactly match specimens from Shiraz and are undoubtedly *bactriana*. Neumann records the typical race from Ras-el-ain near the Syrian boundary, whence I have seen no specimens.

(Capt. Burke says the Chough inhabits the cliffs in Kurdistan and is eaten by the Kurds as food ! It might wander down to the foot hills in our area in winter.)

6. Starling. Sturnus vulgaris. "Beiji."

(1) *Sturnus vulgaris vulgaris*, L. (Syst. Nat. Ed. X., p. 167, 1758—Sweden).

(2) *Sturnus vulgaris caucasicus*, Lorenz. (Beitr. Orn. Faun. Caucas., p. 9, 1887—Kislowodsk).

(3) *Sturnus vulgaris nobilior,* Hume (Stray Feathers, 1879, p. 175—Kandahar).
(4) *Sturnus vulgaris* subsp. ?
(5) *Sturnus vulgaris poltaratskyi,* Finsch. (P. Z. S., London, 1878, p. 713—L. Marka-Kul. Altai).

The Starling is an exceedingly abundant winter visitor to the plains arriving pretty regularly in the last days of October (earliest record 16th), and continuing to arrive throughout most of November. Thus Pitman noted flocks going S. and S. E. on most mornings up to the 24th of the month in the Adhaim-Samarra area, and Cheesman saw flocks passing over Sheik Saad on November 9th. Many move off again by the end of February, and in the first part of March they are quite scarce ; there are several records of small flocks moving north during the early part of this month and the latest date of any seen is the 23rd.

They are of course most abundant where food supply is plentiful, such as round camps, mule lines, transport dumps, etc., and they have their regular feeding and roosting places, the morning and evening flight between the two places being one of the noticeable ornithological features at Basra and elsewhere. Prodigious flocks are to be seen at times ; Evans records a flock exceeding 10,000 birds collecting at dusk near Amara. Hobkirk informs me that the Starling is as elsewhere a good imitator and he has heard it copying the note of the Pintailed Sand-grouse exactly.

Many Starlings found their way into the pot during the seige of Kut and elsewhere during the war, and Cheesman relates an amusing story thereon. At Sheik Saad on one occasion when cartridges were at a premium, a shot " into the brown " brought down a dozen which were secretly handed to the cook. The word was given out to the Mess that a *Quail pie* was provided for dinner with loud acclamation ; unfortunately however on serving, the heads and bills were found protruding and the provider hastily changed his diagnosis to *Snipe pudding,* hoping all would be well ! all partook of the dish without demur, save the O. C., who said he had never eaten *Woodpeckers* yet and he was not going to begin now !!

Thirty-five specimens examined :

(1) Amara, 15-2-18, 3-4-18, 7-11-1 (two), 15-2-18 (three), 4-12-17, 27-1-18 (P. A. B.); Basra, 19-12-18 (Armstrong); Samarra, 4-12-17, 21-12-17 (three); Kut, 4-1-17, 25-11-16 (C. R. P.); Sheik Saad, 13-12-16, 3-3-17 (P. Z. C. and R. E. C.); Suleimania, 12-11-19 (Ross); Shustar, 3-2-18 (F. M. B.); Basra, 21-11-17 (five) (C. B. T.).
(2) Amara, 26-2-18 (P. A. B.); Amara, 15-2-18, 4-2-18 (P. Z. C. and R. E. C.); S. Saad, 18-12-17 (Robinson).
(3) Shaik Saad, 23-12-17, 20-12-17 (Robinson); Kut n. d. (Keary).
(4) ♂ Amara, 26-2-18 (P. A. B.); Shustar, 3-2-18 (F. M. B.).

(1) It is evident from the above numbers that *vulgaris* is far the commonest Starling of Mesopotamia. An east-Russian form has been described—*sophiæ* of Bianchi (=*jitkowi,* Buturlin) differing from the typical race by having more purplish colour on crown and throat and it is this form which has been recorded in winter in the Talysh, Palestine, Egypt, etc. (Hartert Novit. Zool. 25, p. 329) and which might be expected to occur in Mesopotamia. I have examined a very large number of these eastern Starlings and a great many Starlings from western Europe, and in my opinion the differences are too trivial and *far too inconstant* to warrant the separation of *sophiæ.* A great many English Starlings have purple heads and *not green* ones, and several breeding Swedish birds (topo-types of *vulgaris vulgaris*) have *purple* heads, while two birds from Moscow and Voronesh, which should have purple heads, have green ones ! I believe that the older and more worn the typical race becomes, the greener is the head. I can find no constant difference between the two. This " race " *sophiæ* extends as far east as Shiraz in winter.

(2) *caucasicus* is of course a very recognizable race with the red purple wing-coverts and green head, throat, mantle, and undertail coverts, when quite typical; however as with other races it is a little variable and I have examined two from the type locality (breeding) which had the throat purplish and one with purplish violet under-tail coverts. The crown however is invariably dark green.

(3) These three skins are quite inseparable from typical *nobilior* from Kandahar, differing from *caucasicus* in having the head, throat, and undertail coverts purple.

(4) These two birds are very puzzling and agree with no race of which I have been able to see descriptions of specimens of. There are two other skins, which evidently belong to the same race, collected by Mr. Hotson near Shiraz. These four specimens differ from *caucasicus* in having a *bright, vivid green gloss* on the wing-coverts, mixed with violet-blue, instead of a purple red gloss; also the upper parts from mantle to rump have a varying amount of purple sheen mixed with the green, so much so that an adult male from near Shiraz has the whole of the upper part bright purple *and no green gloss* at all. All four skins are winter specimens. As the breeding quarters of this bird are not known and some races have been described by the Russians, the descriptions of which I have not been able to see, I shall not compete with them in making another new race! Dr. Hartert who kindly examined these skins for me says they are "only *caucasicus* in their usual garb," though he admits one has far more purple on the back than usual. With this I must, I fear, disagree. I have examined about a score of typical *caucasicus* and all have the plum-red wing-coverts, utterly different to those in these birds; had there been *one* bird alone which differed from typical *caucasicus*, one might have put it down as an aberration, but with four skins all shewing the same differentiating characters one cannot help supposing that they belong to some other race.

(5) One obtained by Cheesman from a flock at Bagdad on November 21st, 1920, clearly belongs to this race. Perhaps not uncommon.

This does not exhaust the races of Starling which have been *recorded* from Mesopotamia! Meinerzhagen (Ibis 1914, p. 389) *saw purpurascens* in abundance! It may of course occur, but none of our thirty-five skins are referable to this race, and one cannot tell it in the field; such "records" are better left unpublished. Neumann (J. F. O., 1915, p. 121) described a new race from Northern Mesopotamia which he calls *oppenheimi*, and remarks that it does not fit in with any race according to Buturlin's key! He says it breeds in Mesopotamia as Dr. Pietschmann obtained on May 23rd at Mosul a grey, scarcely fledged, young one. Now Neumann's type came from Tel-Halaf (Ras-el-Ain) (between Mosul and the Syrian boundary) in *January* and he has seen a similar bird from Mosul, also in January (recorded by Sassi as *nobilior*), but how he arrives at the conclusion that his new race *breeds* there is beyond my comprehension, especially as the only breeding birds he has seen from this area, and which he describes, do not at all fit in with his diagnosis of *oppenheimi*! What exactly *oppenheimi* is, it is impossible to say without seeing the type and, until a series of breeding birds can be seen from Mosul to ascertain whether a distinct race *does* breed there, it is best, I think, not to recognize Neumann's race. From his description it is very close to *purpurascens* which breeds in Asia Minor and Armenia. Hartert states (Nov. Zool. 25, p. 332) that he has seen a Starling from south Mesopotamia which agreed with Neuman's description.

7. Rosy Pastor. Pastor roseus.

Pastor roseus (L.) (Syst. Nat. Ed. X, p. 170—Lappland).

The migrations of the Rosy Pastor would seem to avoid for the most part the Mesopotamian plain. Pitman saw several at Feluja on May 2nd and obtained one, and on May 7th saw several more which departed in N. W. direction. On

May 21st Cheesman saw a party at Kizil-Robat and more at Kasr-i-Sherin just over the frontier, they were flying N. E. Cumming records it from Fao in the brown juvenile dress. At Urfa Weigold found it common in the vineyards in May. It is apparently a rare bird in S. Palestine and Egypt and its migrations must be largely east and west.

8. Golden Oriole. Oriolus oriolus.

Oriolus oriolus oriolus (L.) (Syst. Nat. Ed. X, p. 107, 1758—Sweden).

The Golden Oriole is a bird of passage in small numbers; arriving rather late in spring, its passage appears to cover the last week in April and the first part of May. Pitman saw it at Feluja on April 27th—29th and Cheesman found males in song at Khazimain on 29th; Buxton met with it at Amara on the 30th and again on May 7th. It was noted at Nasiriyah in May and Cheesman found it at Khanikin on the 21st. Logan Home records that he saw a female at Daur on June 2nd. We have no evidence of it breeding.

At Urfa it would seem to arrive earlier. as often is the case with other migrants, and it is also commoner there; Weigold records that the males arrived on April 18th and the females on the 29th. Cumming recorded it as a passage; migrant at Fao in May and June and again in September.

In autumn there are few records: Kut, August 9th; Amara, 2nd week in September (Buxton); Ramadi, September (Brooking); Basra, September 4th (L. Home); Fao, September 10th (Cumming); while there are skins in the B. M. from Mesopotamia on August 20th and September 1st.

♂, Two skins examined: Feluja, 27-4-17 (C. R. P.); ♀, Amara, 11-5-18 (P. A. B.).

9. Goldfinch. Carduelis carduelis.

(1) *Carduelis carduelis niedicki* (J. J. Ornith, 1907, p. 623—Eregli) (Taurus

(2) *Carduelis carduelis loudoni* (Morn. Monats., 1906—Lenkoran ?).

Goldfinches appear to be rather local and scarce in winter, possibly they are erratic visitants. Cheesman noted it at Qalet Saleh on November 25th, 1917, and on December 20th the same year Buxton found some flocks inhabiting gardens at Amara where they remained till the middle of February. Ross met with a large flock on thistles at Suleimania on December 19th, 1919, and Bailey at Shustar on February 2nd. Weigold obtained two birds at Urfa in April but apparently they were not breeding there; one he thinks is not distinguishable from the European bird and the other is paler and he places it as *niedicki*. Meinerzhagen records a flock at Baghdad on January 2nd.

(1) Nine skins: examined ♂, ? Shustar, 3-2-18 (F. M. B.); ♂, Qalet Saleh, 25-11-17, ♂, Amara, 12-2-18 (P. Z. C. and R. E. C.); ♂, Amara, 27-12-17, ♂?, 13-1-18, ♂ 13-1-18, ♂, 19-12-17 (P. A. B.); Suleimania, 19-12-19 (Ross).

(2) ♂, Amara, 23-11-17, (P. A. B.).

It is quite evident that two races are represented here and that none of the skins are referable to the typical race; the nine skins above are all too pale on the mantle-for this latter race and the cheeks are sullied white; the colour of the mantle alone, a grey brown, separates them at a glance and they are rather smaller. They correspond well with *niedicki*, six topotypes of which I have examined from Eregli, in colouration and in size. The Eregli birds measure 75·5—82 in wing and the Mesopotamian ones 76-81·5 mm. Drs. Buxton and Hartert, who also looked at these birds considered them to be Zarudny's *harmsi* (a name he substituted for *minor* and *brevirostris* which were preoccupied) but neither they nor myself have seen topo-types of *harmsi* (Lac Krasnoye near Baku). However as these birds agree well with *niedicki* and this is the older name they must stand as this and probably it will be found that *harmsi* is a synonym. There is a specimen of this race *niedicki* (Woosnam coll.) in the B. M. from S. coast of the Caspian in March which Witherby (Ibis. 1910, p. 510) records as *minor*.

The single bird (Amara, 23-12-17) stands out from the rest at once and evidently belongs to a different race. It is browner, not so grey above, and more extensively and purer brown, not grey brown, on the flanks, and this colour reaches the undertail coverts. Dr. Buxton tells me it matches well a series of *loudoni* in the Tring Museum from Lenkoran ; these are more like the typical race, but have the crown crimson red, not so flaming vermillion and the spots on the side of the breast dull brown not red brown, and are of the same size—that is larger than *niedicki*.

Lastly there is a bird in the B. M. obtained by Woosman on the Diz R. on March 11th. Witherby (Ibis, 1907, p. 100) referring to this specimen thought it was perhaps nearest the typical race, or might be *volgensis* of Buturlin of which he had seen no specimens. I have examined this bird and could come to no decisive opinion about it ; it certainly is not either *niedicki* or *loudoni* and it is rather large and richly coloured for the typical race. It matches fairly well a bird from Samarkund which is *major*, except that the upper part of the rump is greyer, but I notice that the pureness of white rump in *major* varies somewhat, however it is darker on the mantle than most *major*, are ; in absence of any further similar specimens and of any topo-types of *volgensis* (Ibis, 1906, p. 424, Ssuram to the Urals) one cannot come to any determination, but I may remark that this bird seems to agree with Buturlin's description, and Zarudny records this race in winter from the Karun district.

The distribution of the various races of Goldfinches in this corner of Asia require much more study and further specimens are needed before we can come to any satisfactory conclusion about them. Zarudny says *loudoni* is the breeding bird of Shustar and Kasvin and Buxton found it common at Resht in winter and I have seen winter specimens from Shiraz. The breeding bird of the Persian plateau is apparently *harmsi*, which probably is the same as *niedicki*.

10. Siskin. Carduelis spinus.

Carduelis spinus (L) (Syst. Nat. Ed. X, p. 181, 1758—Sweden).

One obtained by Ross at Suleimania on January 7th, 1920, is the sole record.

11. Linnet. Acanthis cannabina.

Acanthis cannabina fringillirostris, Bp. and Schleg. (Mon. Lox. p. 45, 1850—Cashmere).

Evidently the Linnet is a scarce winter visitor ; Buxton met with a flock of twelve at Amara on February 11th and obtained specimens. Meinerzhagen recorded a flock of Linnets at Nineveh, and Ross got one at Suleimania from a large flock feeding on thistles and reeds on January 29th ; Bailey obtained two early in January at Shustar, where Woosnam had previously met with it (March 21st) ; Witherby thought Woosman's bird was rather dark for this race. Zarudny says that *fringillirostris* is a winter visitor and passage migrant and that the typical race is rare in the Karun district. I have seen none that could be ascribed to the typical race, all our skins are typical *fringillirostris*.

Four skins examined : Amara, 11-2-18 (P. A. B.) ; Shustar, 1-2-18 (F. M. B.) Suleimania, 19-1-20 (Ross).

12. Red-fronted Serin. Serinus pusillus.

Serinus pusillus (Pall.) (Zoogr. Rosso-Asiat. ii, p. 28, 1811—Caucasus and Caspian).

Apparently a scarce, perhaps erratic winter visitor. Buxton met with a flock in a garden at Amara on February 7th, 1918, and obtained four specimens. It breeds in the Caucasus, North Persia, etc.

13. Trumpeter Bullfinch. Buchanetes githaginea.

Buchanetes githaginea crassirostris, Blyth. (J. A. S. B. XVI, p. 476, 1847—Afghanistan).

Tomlinson found this Bullfinch breeding at Ahwaz on a barren hillside on March 25th ; the nest sheltered by a projecting piece of rock contained 4 fresh eggs. Zarudny records it in winter and as nesting in the Karun District in small numbers. No specimens examined but I accept Zarudny's determination of the race. Jourdain informs me that these eggs resemble those of other races of this species and average 18·7 × 14·2 mm.

14. Rose Finch. Rhodospiza obsoleta.

Rhodospiza obsoleta (Licht.) (Eversm. Reise, Anhang., p.132, 1823 —Bokhara).

Buxton obtained one at Amara in a pomegranate bush on December 16th, 1917, it was extremely tame ; he found the remains of another on December 31st. Weigold met with it once at Urfa on April 18th. Tomlinson obtained a nest of 5 eggs on barren hills near Ahwaz on March 25th, 1913 ; 3 of these eggs are in Jourdain's collection and he tells me they exactly agree with eggs from Quetta. No birds were obtained and I consider the evidence inconclusive as certainly in Quetta this bird does *not* breed on barren hills, but in vines and rose bushes in gardens.

15. Chaffinch. Fringilla cælebs.

Fringilla cœlebs cœlebs, L. (Syst. Nat. Ed. X, p. 179, 1758—Sweden).

The Chaffinch is probably a weather migrant in winter to the Mesopotamian plains, and does not come till forced by the hardness of the weather elsewhere. Buxton first noticed it at Amara after a three days cold snap on December 15th and they remained fairly common till March 6th. Pitman records small flocks at Samarra in January and February. It is recorded from Baghdad, Suleimania, Tekrit, Sushtar, from November to January and at Hit on March 8th ; Buxton found it common at Khanikin on November 23rd. Sassi and Meinerzhagen record it at Mosul in January and Zarudny as winter visitor to the Karun district.

Fourteen skins examined : ♂, Amara, 7-3-18, ♀, 11-1-18 (P. A. B.); ♂ ♀, Sushtar—14-1-18 (F. M. B.) ; 6 ♀ ♀, Samarra, 29-1-18, ♀, Baghdad, 30-12-17 (C. R. P.) ; ♀ Amara, 2-1-18 (P.Z.C. and R. E. C.), 2 ♀, Suleimania 14-11-19. (Ross).

I cannot separate these from west European birds. Chaffinches vary much in colour of the breast, the tint in the males being very variable and that in the females probably becoming pinker with age, and this obtains in these Mesopotamian birds as well as in European ones. I can pass no opinion on Menzbier and Sushkin's *salonikoi* from Krim and W. Caucasus. (Orn. Monat., 1913, p. 192.)

16. Brambling. Fringilla montifringilla

Fringilla montifringilla, L. (Syst. Nat. Ed. X, p. 179, 1758—Sweden)

Recorded by Sassi from Mosul in November and February, and by Zarudny in winter in small numbers in the Karun district.

17. Rock Sparrow. Petronia petronia.

(1) *Petronia petronia exigua* (Hellm) (Orn. Jahrb., 1902, p. 128— Rostov on the Don).

(2) *Petronia petronia intermedia*, Hart. (Nov. Zool., 1901, p. 324— Gilgit.)

None of our observers met with this species for certain. Sassi records *exigua* from Mosul on January 24th.

Weigold saw some race at Biredjik where it breeds.

Zarudny and Harms say that *intermedia* is not rare at Salmi in the Karun district in winter; it breeds in the oak wood district of Central Persia (Woosnam). Meinerzhagen records a Rock Sparrow from the hills near Mosul in January and Kingdon Ward says he saw a pair at Samarra.

Photo. Capt. W. Edgar Evans, 20th Oct., 1917.

A.—Creek at Makina, near Busra, Mesopotamia.
Habitat of *Halcyon smyrnensis*, Yellow-throated Sparrow, Indian Roller, &c.

Photo. Capt. W. Edgar Evans, Nov., 1918.

B.—From Table Mt. Jebel Hamrin, N.E. of Baghdad. Rock Nuthatch, &c., ground. Ravens, Griffon Vultures, See-see, *Ammomanes*, &c., seen on these hills.

BIRDS OF MESOPOTAMIA.

18. Desert Rock Sparrow. Carpospiza brachydactyla.

Carpospiza brachydactyla (Bp.) (Consp. Av. i, p. 513, 1850—Konfuda in W. Arabia).

Cheesman found this peculiar sparrow migrating in flocks on April 18th at Fatah Gorge passing up the line of the Jebel Hamrin range going N. N. W.

He says the flight reminded him of that of a Hawfinch and the note is that of a Bunting; a large migration was in progress that day, other species moving in the same direction were Spanish Sparrows, Ortolans and Wagtails.

The crops of specimens obtained contained seeds; the organs were advanced. Later he found it breeding at a fair height on the Kermanshah road in Persian Luristan and the song is a long drawn out note like that of Buntings. The legs and feet in the male are horn colour, in the female pale flesh.

Zarudny records it as a winter visitor and passage migrant in the Karun area; it must I think breed not far from Fao as there is in the British Museum one got by Cumming in 1893 in juvenile dress. This plumage resembles the summer adult (worn) dress but it is a trifle more sandy, and much more sandy than the winter plumage.

Three specimens examined: ♂ ♀, Fatah Gorge, 18-4-19: ♂, Tekrit, 19-4-19 (P. Z. C. and R. E. C.). These agree well with Arabian specimens.

19. Yellow-throated Sparrow. Gymnorhis flavicollis.

Gymnorhis flavicollis transfuga, Hart. (Vog. Pal. F.), p. 145—Bahu-Kelat, Baluchistan).

This is one of the Indian species which extends its range to Mesopotamia. It is a summer visitor to the date palm areas from Fao to Baghdad arriving in April, breeding in the latter part of May or even earlier and leaving again in August and September. Beyond Baghdad there are no records of it; here Cheesman found several in song on April 27th and the organs of a male were well advanced, they were evidently breeding in the tall date palms. Tomlinson records that it breeds in holes of date palms at heights varying from 8 to 20 feet at Basra; the nest is a typical sparrows, untidily built of dead grass and lined with feathers and contains not more than 4 eggs. Cumming however at Fao notes as many as five or six eggs in the clutch, and says the eggs are typical sparrows eggs but vary much in colour and notes three distinct types, one of which is erythristic—a pinkish white ground mottled with pale reddish brown spots. Jourdain informs me the eggs in his collection are at once recognizable from those of the House Sparrow by their smaller size, and the average size of ten eggs is 18·8 × 13·8 m.m.

Cheesman records that one shot had the gizzard full of beetles.

Five skins examined: ♂, Fao, 6-5-18 (Armstrong); Khazimain, 27-4-19; Basra, 18-4-17 (P. Z. C. and R. E. C.); 2 Basra, 1918 (Hobkirk).

These correspond perfectly with topo-types from Baluchistan which are paler than the typical race from the Central Provinces of India.

20. House Sparrow. Passer domesticus. "Asfur."

Passer domesticus biblicus, Hart. (Vog. Pal. F., p. 149—Suemc, Palestine ?).

A very common resident throughout Mesopotamia wherever there are habitations, and even following the camps out into the desert. In places where food is abundant such as supply depots, mule lines, etc., it occurs in huge flocks. They breed early, as Cheesman noted them feeding young with caterpillars on April 19th, and nests may be found at the end of June; so that as in other races this form has two or more broods. A variety of nesting sites are chosen; Pitman found at Kut and Adhaim many nests in scrub jungle, some in quite small bushes, and Zarudny records finding 29 nests in one small bush in the Karun district; trees of course are utilized, especially poplar and palm buildings

and ruins of all sorts, holes in banks, and even the nest hole of *Ceryle rudis* was appropriated in one case reported by Evans, the deserted Kingfishers being found behind the Sparrows.

The question arises what race or races of House Sparrow inhabit our area. From S. W. Persia and the head of the Gulf *indicus* has been repeatedly stated to occur (Zarudny, Harms, Witherby, etc.). Now I have examined a very large series from the Mesopotamian plain,—from Basra in the south to the Adhaim in the north, and these match typical *biblicus* in every way and certainly are not *indicus*, as they are too large and have *grey*, not white cheeks. In S. W. Persia I have seen *biblicus* from Shustar, Dizful and even up to Kermanshah. The south coast of the Caspian is inhabited by sparrows which I cannot separate from the typical form. *Indicus*, which is a small bird (wing usually 76-78 mm. in males) and has white cheeks, I have not seen west of Gwader on the Mekran coast; at Bampur, Karman, Shiraz, Bushire (in winter), Afghanistan and probably Beluchistan there lives a white-cheeked sparrow which has always been called *indicus*, but for this it is much too big; it is *parkini* of Whistler, a bird of considerable range and whose type locality is Srinagar. Cashmere (*vide* Bull. B. O. C. cclii, p. 13, 1920). Weigold says that specimens from Urfa are not distinguishable from the typical form and Kolibay thinks the same. I have seen none from this district so cannot pass any opinion. Sassi records *indicus* from Mosul, probably an error.

23 skins examined: ♂, Kazimain, 9-2-19, 6-5-19; ♂, 7-4-19; Amara, 14-3-18 (two); ♂, Basra, 19-4-17; ♀, Shustar, 13-1-18; ♀, Sheik Saad, 25-11-16; ♀, Zoar, 4-2-19 (two) (P. Z. C. and R. E. C.); 2 ♂ ♀, Samarra, 6-3-18; ♂, Adhaim, 20-10-17 (two); ♂, 7-10-17; ♀, Bait-al-Khalifa, 21-12-17 (two) (C. R. P.); ♀, Shustar, 13-1-18; 3 ♀, Basra, 21-11-17; ♀, 17-3-18 (C. B. T.). Wing ♂, 79—83·5 mm., bill from base 14. ♀ 77·5-82mm.

21. Scrub Sparrow. Passer moabiticus.

Passer moabiticus moabiticus, Trist. (P. Z. S. Lond, 1864, p. 169—Dead Sea).

This handsome little Sparrow is a local resident in suitable localities, wandering away from its breeding haunts further afield in winter. Buxton met with a small flock at Amara on December 9th in deep scrub of *Prosopis*, *Rubus*, *Tamarix*, Liquorice, etc., and he saw another flock in the same place mixed with *domesticus* on the 16th. Pitman found several large flocks 10 miles N. of Kut near the Tigris in scrub and *Sueda* bushes on March 3rd and met with them again in the same area in scrub round floods on April 7th and 10th. He noticed them searching the leaves of the *Sueda* bushes for insects. Cheesman met with it mixed with flocks of *hispaniolensis* near Amara on January 13th. He has already given an account (Bull. B.O.C. CCXLVI, p. 39) of the nesting of this bird which I reproduce:—

> "On May 1st, 1919, this colony was nesting in thick scrub jungle near Baghdad. The jungle was several miles in extent on the banks of the Tigris. . . . The nests were always built in the stout stems of the Euphrates Poplar or trees of dwarf Tamarisk 5 feet to 8 feet from the ground. There were perhaps 100 nests scattered over 6 miles. Generally the nests were 200 yards apart. The main structure is of sticks and resembles a small Magpie's nest. The large size of the stick selected is remarkable when the smallness of the bird is considered. The eggs are placed on a thick pad of down from rushes and thistles, a few fibres and small feathers. The roof is covered in, and the entrance is a small hole which winds down out of sight from the top in a spiral."
>
> "One nest contained one half-fledged young and one egg, another 5 eggs, 2 fresh and 2 near hatching, another 6 eggs all fresh, another 3 eggs all fresh. One nest, an old one, was being renovated by a pair of birds. The

clutches are usually composed of a majority of dark eggs, with one or two totally different, being white with a few brown spots or blotches."

Zarudny, who first discovered this Sparrow in Mesopotamia, found it in great numbers in the lower reaches of the Karun between Ahwaz and Nasrie at the end of January and beginning of February in jungle of Tamarisk, *Lycium* and Poplar. Here he found old nests. He also met with it at Shellgati on the Gagar R. in thick fruit gardens and at Kulichan on March 24th found it breeding in Tamarisk. From specimens he obtained on this expedition he separated this Sparrow as *mesopotamicus*, being intermediate in colour between *moabiticus* from the Dead Sea and the very distinct Seistan form *yatii* and he says it is larger than *moabiticus*.

He gives the measurements of *mesopotamicus*—

♂, wing 62–66·3, tail 52·3,—56.5 m m.
♀ ,, 59·3–63·5 ,, 49·3—53·6 m m.

Of typical *moabiticus* he *only had two* specimens for comparison!

I have examined the following skins from Mesopotamia:—

♂, nr. Baghdad, 30-4-19, W. 64·5, T. 59·5, B. 10 (P. Z. C. and R. E.C.).
♂, Amara, 16-12-17, W. 66·5, T. 50·5, B. 10·5 (P.A.B.)
♂, Amara, 9-12-17, W. 63, T. 48·5, B. 9·75 (P. A. B.).
♀, Amara, 16-12-17, W. 62·5, T. 51, B. 10 (P. A. B.).
♀, nr. Baghdad, 30-4-19, W. 62·5, T. 49·5 B. 10 (P. Z. C. and R. E. C.)

Of typical *moabiticus* from the Dead Sea I have examined 11 males and 9 females. These males measure W. 61—64·5 m.m., T. 47·5—62 m.m. and the females W. 59–62, T. 47·5–51. Between the Mesopotamian and Dead Sea birds I cannot see the slightest difference in colour and, as above, there is practically no difference in size. I can only regard *mesopotamicus*, Zar., as a synonym of *moabiticus*, Trist.

22. Spanish Sparrow. Passer hispaniolensis.

Passer hispaniolensis transcaspicus, Tschusi (Orn. Jahrb., 1903, p. 10,—Jelotan in Transcaspia).

A winter visitor in great numbers, widely but rather patchily distributed. There are no records of it before December 7th when Buxton noted that many arrived at Amara and spent the winter. They became commoner still in February and then gradually disappeared, the last being seen in the first week in April. He noted that they did not consort with House Sparrows and used to roost all the winter in dense Poplar scrub and *Lycium* bushes in the desert, even a couple of miles from the river. Pitman found it common in the Kut area in February and says it may have been there earlier, and he noted it wherever suitable scrub existed between Kut and Baghdad; he met with it again at Feluja on April 17th during the spring migration of Wagtails, etc., while Cheesman saw large and frequent flocks on April 18th at Fatah Gorge passing up the line of the Jebel Hamrin together with Wagtails, Ortolans and *Carpospiza* in a very large migration rush. Cumming noted it at Fao with House Sparrows during the winter and early spring.

Zarudny in 1911 includes it in his Karun list as common in winter and *nesting in small numbers*. Writing in 1913 on the Sparrows of Persia (J. F. O., 1913) he says it is common at Wais, Mohommera and Karun River, also at Ahwaz and Shustar, from January to March and adds *there is no evidence of its breeding*! He further remarks that birds corresponding to *palestinæ*, Tschusi, are to be found in Persia, Transcaspia, Bokhara and Turkestan. I do not know this latter race but some *transcaspicus* are quite difficult enough to tell from typical *hispaniolensis* including some Palestine and Mesopotamian specimens and single birds might equally well be of the latter form; on the whole however I refer them to *transcaspicus*.

25 specimens examined : ♂, Shustar, 13-1-18, 18-1-18 (F. M. B.); 3 ♂, Amara, 29-1-18 ; ♀, Zoar, 4-2-18 ; Fatah, 18-4-19 (P. Z. C. and R. E. C.).

♂ ♀, Feluja, 17-4-17; ♀, Kut, 19-2-17, 3 ♂, 19-2-17 (C. R. P.); 6 ♂, Amara, 27-1-18, ♂, 21-1-18, 11-3-18, 25-1-18, 13-3-18, 28-2-18, 30-3-18 (P.A.B.).

Wing of ♂, 77-84 mm. The young birds of the year have broader edges to the upper parts and are very pale and these and fresh moulted birds are the most easily distinguishable, worn birds are most difficult to separate. The males of the year have on the whole the shorter wing.

23. Tree Sparrow. Passer montanus.

Magrath is quite certain that he saw Tree Sparrows amongst flocks of Spanish Sparrows at Felahiyeh on February 10th, 1917. There are no other records for Mesopotamia, but as it is not an unlikely bird to occur (it occurs in many parts of N. Persia) in winter and Magrath knows the species well I include it.

24. Corn Bunting. Emberiza calandra.

Emberiza calandra calandra, L. (Syst. Nat. Ed. X, p. 176—Sweden).

The Corn Bunting is more or less resident in the Mesopotamian plain, apparently such migrations as it performs being only local and so in some places, such as Kut, it appears in the winter months only. It is widely distributed in winter, frequenting scrub, arable land and corn fields. To places where it is a winter visitor it leaves by about mid April and so a certain amount of migration may be noticed in districts where it is in winter not common, from the end of March onwards.

The only breeding record comes from Shaura about 40 miles south of Mosul where Aldworth obtained a nest of six eggs and the parent bird on March 24th.

It probably breeds elsewhere, as at Amara, where Buxton obtained a male with advanced organs on April 7th. Cheesman noted a pair in song and the male displaying at Sheik Saad as early as December 20th.

Weigold says this species was not common in the Urfa district and became rarer eastwards ; he records it from Serudj on the Euphrates. Zarudny records it as wintering in the Karun district, where Woosnam also found it at Shush and Shuster in March.

Nine skins examined : ♀, Shustar, 3-2-18 (two) (F. M. B.); ♀, Kut, 12-2-17 ; ♂, Feluja, 30-3-17; (C. R. P.); ♀, Sheik Saad, 24-3-17 ; 20-12-16 (P. Z. C. and R. E. C.); ♂, Zorr, 18-3-18; ♂, Amara, 7-4-18; o ? 11-2-18. (P.A.B.).

I cannot separate these birds from the typical race either by size or colour ; at least two Eastern races have been described, *minor* of Radde from Tiflis, *buturlini* of Johansen from Kastek in W. Siberia (*crede,* Hartert) and another *buturlini* of Zarudny from Turkestan ! I have examined a good many Turkestan birds and cannot separate winter or March birds thence from European ones. Eastern birds generally wear quicker than western ones and so birds, like Corn Buntings, appear greyer above and whiter below earlier in the year than do western examples ; but these latter in a few weeks will also become as grey and white as the eastern ones. Also the amount of brownness or greyness above and the yellowness or whiteness below varies a good deal individually.

25. Yellow Bunting. Emberiza citrinella.

This Bunting is apparently quite a straggler to Mesopotamia. Hobkirk is quite certain he saw one at Basra on April 10th and from his description it would seem that this was so. Sassi obtained two from Mosul on January 23rd and Weigold saw one near Urfa on April 8th ; both suppose that their birds belong to the eastern race *erythrogenys* which race Zarudny also gives as wintering in the Karun district. As I have seen no specimens from our area I leave out the trinomial name.

[Meinerzhagen states (Ibis, 1914, p. 390) that he saw *Emberiza leucocephala* near Baghdad ; as there are no other records of this bird I include the record in square brackets.]

26. Black-headed Bunting. Emberiza melanocephala.

Emberiza melanocephala, (Hist. pl. 42 1769,—Carniola). Scop. (Annus I. Nat.

To most of our district this species is, where it occurs at all, a passage migrant and all the records refer to the spring. Pitman says a few arrived at Feluja on April 17th and inhabited some locust-infested fields together with Ortolans and Wagtails until the 21st, when they disappeared. Cheesman noted odd ones at Fatah Gorge on April 18th and Tomlinson records a large flock at Shustar on the 19th. Cumming found it at Bushire on the 14th, while Cheesman reports it from Shush on May 1st. It would appear from the absence of other records that this species comes from the south-east and migrates along the line of the Jebel Hamrin.

In the Urfa district according to Weigold the males appeared on April 28th. It evidently breeds at Mosul, and perhaps elsewhere in northern Mesopotamia. as Sassi says he received 11 eggs from there, but gives no further particulars.

Three skins examined : ♂ Feluja, 17, 21 and 22, iv, 17 (C. R. P.).

27. Red-headed Bunting. Emberiza icterica.

Emberiza icterica, (Add. ad. Pall. Zoogr. Russo. Asiat, ii, Eversm. p. 10, 1841—Caspian) (=*luteola auct*).

The only record of this species is that of a single young bird obtained at Fao by Cumming.

28. Grey-headed Bunting. Emberiza cinerea

Emberiza cinerea semenowi, Zar. (Orn. Jahrb. xv, 1904, p. 117—Arabistan).

This somewhat rare Bunting is recorded by Zarudny as a passage migrant in the Karun district. Cumming obtained it at Bushire on March 27th. As it nests in large numbers in Arabistan (Zarudny) and occurs in Syria it should be met with more commonly in Mesopotamia. Possibly it has been overlooked. The grey head and rump, and yellow throat should suffice to distinguish from other species.

29. Ortolan Bunting. Emberiza hortulana.

Emberiza hortulana, L. (Syst. Nat. Ed. X, p. 177, 1758—Sweden).

This also is a passage migrant within our area and most records refer to the spring. Cheesman noted large and frequent flocks passing up the line of the Jebel Hamrin at Fatah Gorge on April 18th, halting for a few moments on a bush by a pool to drink before dashing off N.N. W. again. Pitman records it in great numbers from April 15th to 20th feeding on young locusts and roosting in tall poplars. After the latter date only a few were seen and the last on May 8th. He also met with it in the Kut area from April 7th to 10th. Magrath saw a passing flock at Basra on April 22nd, and Cheesman came across small parties on the Baghdad-Tekrit railway feeding on the desert where it had been burnt by grass fires. Zarudny records it as a passage migrant in his area also, and Weigold says they first arrived at Urfa on April 10th and continued passing to the end of the month. The only autumn record relates to the oasis of Shaiba where Cheesman found a pair at a well on September 27th.

Five skins examined : ♂, Basra, 18-4-17 ; ♂, Tekrit,17-4-19 ; Shaiba, 27-9-16 (P.Z. C. and R. E. C.); ♂ ♀, Faluja 17-4-17 (C. R. P.) ; ♂ ♀, wing, 89-93 mm.

These Mesopotamian birds differ in no way from European ones, nor do those I have seen from Persia, whence the so-called *shah* was described ; *a few* Eastern birds are a millimeter or so longer than European ones, sex for sex, but the difference is not sufficiently marked to warrant separation.

30. Grey-necked Bunting. Emberiza buchanani.

Emberiza buchanani, Blyth (J. A. S. B, xiii, p. 957—Indian Peninsula).

Recorded only by Zarudny who says it is a passage migrant in the Karun district. It nests in small numbers in the Zagros Mountains.

31. Rustic Bunting. Emberiza rustica.

Emberiza rustica, Pall. (Reise, Reichs. iii, p. 698, 1776—Daruria).

Recorded by Zarudny as a winter visitor to his district.

32. House Bunting. Emberiza striolata.

Emberiza striolata striolata (Licht.) (Verz. Doubl. Zool. Mus., Berlin, p. 24, 1823—Ambukol in Nubia).

Zarudny records this Bunting also in winter in the Karun District and thinks it may nest there—presumably in the low hills.

33. Reed Bunting. Emberiza schœniclus.

Emberiza schœniclus pallidior, Hart. (Vog. Pal. F., p. 197—Aiderl in Turkestan).

The Reed Bunting appears to be uncommon, or very local as a winter visitor. Pitman states that he found a large flock near Kut frequenting some scrub of *Sueda* bushes by the Tigris in January, they were very noisy and shy; otherwise he only met with a single bird at Samarra on December 18th. Cheesman got a specimen at Sheik Saad on December 6th, the bird's head was so covered with ticks that it could hardly fly; Magrath records it at Basra where I saw a single bird in reed beds on November 20th. Zarudny records this race as a winter visitor to the Karun, as also the typical form.

Four specimens examined: Sheik Saad, 6-12-16; Amara, 2-2-18 (P. Z. C. and R. E. C.); Samarra, 13-12-17; Kut, 13-1-17 (C. R. P.)

These all belong to the pale eastern race.

34. Black-crowned Finch Lark. Pyrrhulauda frontalis.

This Finch Lark was met with near the oasis of Shaiba on August 12th by Buxton and Cheesman. Logan Hume informs me he saw it in the same district (Rumailah) in June in pairs. It is evidently resident on this edge of the Syrio-Arabian desert and is not recorded from anywhere else in Mesopotamia.

Two skins were obtained, both males, wings 85 and 86·5 mm. and not quite fully grown. These two birds do not match any race of *frontalis* which I have seen and although I think that the birds, inhabiting Shaiba will prove to be a new race, yet I at present hesitate to separate them on only two specimens, as there is in all races a certain amount of individual variation.

This Finch Lark has a very wide distribution, various races ranging from N. E. Africa through Arabia to Baluchistan east to Sind and Punjab.

The following races have been recognized:—

(1) *P. f. frontalis*, Bp. (Consp. Avium, 1850, p. 512—Nubia), Our birds differ considerably from this in having a more finch like, stumpier, higher bill; a black nuchal spot; greyer rump and upper tail coverts and longer wing.

(2) *P. f. melanauchen* Cab. (Mus. Hein. i, 1851, p. 124—Abyssinan coast, Somaliland, etc.).

(3) *P. f. syncipitalis*, Blyth (Ibis, 1867, p. 185—S. Arabia). Rather near this race but Arabian examples I have seen measure in wing 79-82 mm.

(4) *P. f. affinis*, Blyth (Ibis, 1867, p. 185, Type Madras (in error!) I designate Karachi in Sind) Differs from Sind birds in the upper parts being more isabelline washed with grey and with no obsolete dark centres, while the black of the crown and under parts is more intense; the wing is as long or longer. I have however been unable to see any Indian specimens in exactly the same plumage as these Shaiba birds.

The exact determination of this race is of considerable interest and further specimens are greatly desired. Between Shaiba and Persian Beluchistan there are no records of any Finch Lark.

35. Calandra Lark. Melanocorypha calandra. "Usawah."

(1) *Melanocorypha calandra calandra* (L.) (Syst. Nat. Ed. xii, p. 288, 1766—Pyrenees).

(2) *Melanocorypha calandra psammochroa*, Hart. (Vog. Pal. F., p. 210—Dur-Badom, Persia).

This is evidently a local bird and much commoner above Baghdad on the uplands than below on the plains. Logan Home says it arrived at Tekrit in December in large flocks and paired off at the end of February; he records that eggs were taken in this district—on March 29th a clutch of five, and another of four at the end of May; at the nest the birds were very tame; one was secured for identification. Cheesman found it plentiful on the hills and plateau at Kalat Sherghat early in December, and at Samarra Pitman saw large flocks and obtained several examples; here he found them in immense flocks from mid-November, when he arrived, till mid-March when he left, though a good many moved away during February. They were very noisy and frequented mule lined, camps, litter roads, etc., and proved excellent eating! In the Adhaim area from September to mid-November and at Feluja from March to April he however never met with it. At Urfa Weigold found this Lark quite common in large flocks on passage in mid-April, but he obtained no specimens. Sassi, who examined four skins from Mosul, considered them to belong to the typical race, not to the eastern.

From Baghdad southwards there are few records; Buxton met with a single bird at Kumait on February 28th and Cheesman found a few small parties at Twin Canals on December 1st. Entering the hill country again Witherby recorded it from Ahwaz on February 26th and Bailey obtained it at Shustar on February 1st. Zarudny lists it as a winter visitor (Karun District).

Eleven skins examined: ♂ ♀, Shustar, 1-2-18 (F. M. B.); 4 ♂, Samarra, 14-12-17; 2 ♀, 4-12-17, 31-12-17 (C. R. P.); ♂, Shergat, 12-188, ♀, Twin Canals, 1-12-16 (P. Z. C. and R. E. C.); one, Kumait, 28-2-18 (P. A. B.).

In determining these birds I have examined a very large series of Calandra Larks. Compared with European and with eastern skins (Persia, Turkestan, etc.), they correspond best with the latter (*psammochroa*), in being paler and yellower, especially on the rump and mantle, than the western race; one must be very careful in comparing these larks to compare birds in a similar state of wear; it is true that *psammochroa* is on the whole a *yellower* bird than *calandra* but as time goes on (April-May) it also gets very grey, rather a paler grey than the western birds. Some birds partly worn (about December) in both races are difficult to tell and odd ones of our Mesopotamian birds might equally belong to either race. From Pitman's observations it seems probable that some Calandra Larks are winter visitors and it is possible that these belong to the typical race which Sassi too recorded from Mosul.

Birds which I have examined from Palestine (Sharon, Meroni, Bashan and Ludd (10 skins) are quite different to the Mesopotamian birds in being much more rufous brown, and in fresh feathers are very red brown, with red brown flanks; these I take to be Meinerzhagen's *hebraica* (Bull. B. O. C. XLI, p. 21): one bird too from Cyprus and one from Syria match them exactly, other Cyprus birds being *calandra*; on the other hand *psammochroa* is evidently also found in Palestine whence I have seen two examples (Jaffa, March 3rd, and Judæa, February 1st). From Anatolia and Erzeroum I have seen the typical western form. Meinerzhagen (l. c.) seems to think that his *hebraica* has a shorter wing than *psammochroa*; he gives for males 127—131 mm. as against 130—135 mm. in *psammochroa*. With this I cannot agree as those which I have examined of

hebraica run up to 137 mm. Nor can I find any difference in wing measurements between *calandra* and *psammochroa*; in the two sexes the wings range from 118—142 (22 from Europe) and 120—138 mm. (Persia, Turkestan, etc.). Bills are very variable apart from sex in all these races, some are large, some small; some high and stout; some long and thinner, and I can state with some confidence there is no difference in wing length in the three races.

36. Bimaculated Lark. Melanocorypha bimaculata.

Melanocorypha bimaculata bimaculata (Menetr.) (Cat. Rais., p. 37, 1837—Talysh).

The only record of this species is from Cheesman who on April 19th found several pairs evidently breeding in well clothed desert country along the Samarra-Tekrit railway, and obtained a specimen which belongs to the typical form. It has been recorded from Shustar on March 21st and is entered as a winter visitor by Zarudny to the Karun area. As both species of this large Lark breed in Mesopotamia, I must warn oologists, though it should not be necessary, to obtain the bird with any eggs they take.

37. Short-toed Lark. Calandrella brachydactyla.

(1) *Calandrella brachydactyla brachydactyla* (Leisler). (Ann. d. Wetter Ges. iii, p. 357, 1814—Montpellier, S. France).

(2) *Calandrella brachydactyla longipennis* (Eversm). (Bull. Soc. Imp. d. Nat. Moskow, xxi, p. 219, 1848—Dzungharia, E. Turkestan).

(1) No observers distinguished between this species and the Lesser Short-toed Lark in the field and so it is impossible to do more than state that Pitman met with a few, which had just arrived, on October 16th and 17th at Samarra and obtained two specimens belonging to this race. Weigold got several specimens in the Urfa district where he says it was very common between April 18th and May 2nd.

The status requires further investigation.

(2) Cumming obtained a typical specimen of this race at Fao on September 25th, 1886. It is in the British Museum where I have examined it.

38. Lesser Short-toed Lark. Calandrella minor.

(1) *Calandrella minor heinei.* (Hom.) (J. F. O., 1873, p. 197—Volga).

(2) *Calandrella minor minor* (Cab.) (Mus. Hein. I, p. 123, 1851—N. E Africa).

(1) Pitman's notes apparently mostly refer to this race of which he obtained a large series. He says they arrived in large flocks about the middle of October and from the 26th onwards thousands were passing to the south in the Samarra district. They were exceedingly plentiful in this district from mid-November till the middle of February when they began to disappear and by the end of the month most had gone. A few were noted on March 15th—19th in the Baghdad area and the last recorded was on the 23rd at Feluja. During the winter at Samarra they frequented a bare plain where there had been grass, etc., in flocks of thousands and were distinguished by their noisy chirping and dipping flight.

Buxton says this race was not common round Amara itself but he found it common in small flocks out in the desert among *Sueda* bushes in winter. It is probably common in suitable places throughout the country. I obtained one from a large flock of mostly *minor minor* at Basra on November in a short grass field and Cheesman obtained several specimens on the Tigris in the Sheik Saad—Azizieh district.

19 specimens examined: Samarra district, 26-10 to 21-12-17 (11 skins) Feluja, 23-3-17 (2 skins) (C. R. P.); Amara, 16-12-17 (P. A. B.); ♂ Azizieh, 3-1-19 (2 skins); Sheik Saad, 1-11-16; Twin Canals, 1-12-16 (P. Z. C. and

R. E. C.); ♂ Basra, 21-11-17. (C. B. T.) Wings measure, ♂ ♀ 90-103. This race is greyer and less red-brown than *m. minor.*

(2) The status of this race is obscure. Cheesman obtained one from a flock at Kasimain in the desert on March 5th and one of Pitman's Samarra birds on November 4th on which day he got also *heinei*, I refer to this race ; probably they flock together in winter as I obtained twelve specimens out of a huge flock at Basra on November 21st and from the same flock one typical *heinei*. Cumming obtained two at Fao on August 26th and September 25th, 1886.

Zarudny records *minor* and *persica* from the Karun district in winter and on passage ; no specimens of ours are referable to *persica*. ♂ 92—95·5; ♀ 87·5—91 mm.

Some soft of Short-toed Lark, whether of the *minor* or *brachydactyla* group is not known, breeds, according to Cheesman, on the undulating uplands above Tekrit.

39. Desert Lark. Ammomanes deserti.

Ammomanes deserti fraterculus, Trist. (P. Z. S. Lond., 1864, p. 434—Palestine). (I restrict this to " Wilderness of Judæa ".)

The Desert Lark occurs in at least four areas in Mesopotamia but whether all belong to the same species or race is not known. It is fairly common in the Tekrit-Adhaim area frequenting bare plain or rocky ground and is evidently resident and breeds there, as L. Home found them in pairs on the Tekrit uplands in May and found several nests, and Pitman and Cheesman met with it in this district in winter in pairs or small parties. It probably occurs in the foot hills up to the Kurdistan boundary. Pitman notes that it can always be distinguished in the field by its querulous piping note.

A Desert Lark occurs on the western side of the Euphrates in the Museyib district north of the Kerbela canal, where Pitman saw a few in June. Logan Home records it from the desert west of the Euphrates at Rumailah on June 5th, where it was evidently breeding. Zarudny says *fraterculus* is resident in the Karun foot hills. All our specimens come from the Tekrit-Adhaim area and all belong to the Palestine form *fraterculus*, but it does not at all follow that the birds from the Syrio-Arabian desert (west of the Euphrates) also belong to this form ; they may even belong to a race of the other species *phœnicura*, and therefore specimens from this desert are highly desirable.

Buxton too informs me that one he obtained at Kasr-i-Sherin just over the Persian frontier on the Kermanshah road does not belong to the form *fraterculus* nor to any race of which there are specimens in British or Tring Museum. Further specimens from this neighbourhood also are *desiderata*. The Desert Larks are peculiarly local birds in their racial forms and though one may have one race of wide distribution, abutting on its area may be another race whose distribution is very local, and therefore the determination of this Lark in Mesopotamia cannot be fully made out until specimens are forthcoming from every district in which it occurs.

Nine specimens examined : Bait-al-Khalifa, 19-12-17 (two) ; Shat-al-Adhaim, 2-10-17 (two) ; (C. R. P). ♂ ♀, Samarra, 30-11-18 ; ♂, Tekrit, 17-4-19. (P. Z. C. and R. E. C.).

These are in no way distinguishable from specimens from the Dead Sea and Wilderness of Judæa.

40. Crested Lark. Galerida cristata.

Galerida cristata magna, Hume (Ibis, 1871, p. 407—Yarkand).

This may be said to be the commonest and most generally distributed bird in Mesopotamia, frequenting almost every kind of ground, though naturally scarcer in quite bare desert and thick scrub ; even the oases have their pair of Crested Larks, about the only resident birds they can boast. It is resident throughout the whole district, but its numbers are augmented in winter by immigrants from

elsewhere (as noted by Buxton and Pitman), flocks being seen in February when most of the resident birds have paired off ; Cumming, who noted the same thing at Fao, states that these winter visitors come in August and leave in April.

The breeding season commences at the end of March ; the earliest nest contained three eggs on the 30th. Pitman, who found 39 nests, says many have nests and some are sitting by the middle of April and he notes young hatched on May 29th ; so that it seems certain that at least two broods are hatched out. The usual clutch is four or five and Logan Home several times found six in a nest. The nest, rather untidy and scanty, consists of dry bents, dirty straw, etc., and is placed in any convenient hollow such as a hoof mark, under a tuft of grass, or on bare ground concealed by grass, clods of earth, or bushes.

As in other races, this bird is a mimic of other birds. Pitman noted that it often perches on walls, low bushes, telegraph wires, etc., and does good by feeding on the maggots of flies. Many of them are subject to attacks by ticks and are much affected by heat, and then they seek the shade of tents and water courses in lieu of trees.

Thirty-five skins examined : From every month except May, June and September and from throughout our area from Samarra in the north to Basra and Shustar in the south ; 20 males, 8 females, 7 unsexed.

Wings of males 107—113 mm., of females 98·5—104 mm. Bills (exposed) both sexes 17—18·5 mm., 19—22·5 mm. from base.

These Crested Larks are so near *magna* that I hesitate to separate them and with this Dr. Hartert agrees. If anything they run rather smaller than the majority of *magna* but there is a big overlap. Wings of *magna* (Afghanistan, Beluchistan, etc.) which I have measured run 105—117 (once 120 mm.) and it will be seen that some of our Mesopotamian birds are smaller than this and none reach the extremely large measurements some *magna* shew. In coloration fresh moulted birds are quite like fresh moulted *magna*, but when a little worn most of our birds seem a trifle browner, less *sandy* yellow on the upperparts and the larger markings of these parts make them appear somewhat darker. One must allow for a certain amount of individual variation and certainly a good many of our birds could not be picked out from a series of *magna*. I have compared our series with the topo-types of *brachyura, iwanowi* and *subtaurica* and they certainly do not belong to any of these races. In *Orn. Monats*, 20, Kolibay separated as *weigoldi* the Crested Lark from Urfa (on one pair and two of doubtful sex).

I have seen no specimens from this place but from the description they appear to be the same birds as ours. If any one considers the above characters as sufficiently distinctive then our Crested Lark must stand as *weigoldi*, but I am inclined to treat this name as a synonymn of *magna*.

41. Sky Lark. Alauda arvensis.

(1) *Alauda arvensis dulcivox*, Brooks (Stray Feathers, i, p. 484, 1873—Alpine region of N. India).

(2) *Alauda arvensis cantarella*, Bp. (Icon. F. Ital. Uccelli, Introd. p. 5 1832—41 Italy).

The Sky Lark is a common winter visitor to the Mesopotamian plains frequenting desert, plough and green crops, preferring open country to gardens. It arrives at the end of October and Pitman on the Adhaim river noted flocks flying south till November 7th. It is recorded from most suitable localities as far south as Amara and it is probably pure chance that there are no records from Basra district, as it occurs at Ahwaz and Bushire. Cheesman says that the Sky Lark is a serious pest in some districts, as at Sheik Saad, where large flocks cleared off acres of beet root and cabbage seedlings ; no method of prevention was found to be efficacious, both guns and two men per acre to scare the birds off proving useless ; he noted however that seedlings with more than four leaves are practically immune. The only plan which seems to offer

any solution would be to sow the seeds a little earlier so that all the plants have more than four leaves before the Sky Larks arrive, though whether this is possible or not I leave to the agriculturists. Logan Home noted that in the Tekrit area they often associated with Calandra Larks.

The Sky Larks leaves again in March, many have gone by mid. March and all have departed by the end of the third week.

Thirty skins examined November to March, but many of them were in poor condition and the determination of the races in some has been very difficult or impossible. There is no doubt however that the majority belong to the grey eastern form *dulcivox*, and that this is the commonest of the two races. Eight birds I refer to the South-East European race *cantarella* which is rather darker. Zarudny records both races for the Karun district in winter and Neumann records *A. arborea cinerea* (a mis-print for *A. arvensis cinerea* from Ras-el-Ain. 15 specimens of *dulcivox* measure :—Wing 105—120 mm.

Of recent years the name *cinerea* (or *cinerascens*) of Ehmcke has been used for this grey Eastern Sky Lark which is the breeding bird of West Siberia, Turkestan, etc., and quite incorrectly as I believe. Brooks (S. F. i, p. 484) described a Sky Lark, clearly of the *arvensis* group, from the Alpine region of North India as *dulcivox*. His description agrees well with the Siberian bird and he did not say nor is there any proof that his *dulcivox* was breeding in the Himalayas*. Most of the older records of Sky Larks breeding in this region were muddled up with *gulgula* and so far as I have been able to ascertain no *arvensis* breeds in the alpine regions of North India except perhaps locally in Cashmere, and these seem to me to be in no way different from the Siberian breeding birds, hence *cinerascens* must give place to the much older name of *dulcivox* for this race.

42. Wood-Lark. Lullula arborea.

? *Lullula arborea pallida*, Zar. (Orn. Monat., 1902, p. 54—(Mountains of Transcaspia.)

This species was perhaps overlooked by most observers as there are only records from Amara, where Cheesman and Buxton found it plentiful in small parties on the river banks from November to February 10th, 1918. I have no other records from Mesopotamia. Zarudny includes it as a breeding species in the Zagros and Khorasan districts.

Four specimens examined ; these are paler above, especially on the rump than the typical race from western Europe and the underparts not so yellow below, in fact barely tinged with yellow. Similarly pale winter birds are to be found in Palestine, the Taurus and Syria. Woodlarks are exceedingly difficult birds to determine races of as each month's wear makes such a great difference in the plumage, but these four skins are distinctly paler than West European ones at the same time of the year and it is probable that an Eastern race should be recognized and so I place them under Zarudny's name *pallida* tentatively, as I have not seen any birds from Transcaspia.

43. Bifasciated Lark. Alæmon alaudipes.

Alæmon alaudipes pallida, Blyth (J. A. S. B. xvi, p. 130, 1847—Ullah Bund in Sind.

So far as records go this lark is only found on the desert on the west side of the Euphrates and Shat-al-Arab ; Cheesman, who travelled extensively throughout the country, failed to meet with it elsewhere. Cheesman and Buxton met with it fairly commonly at Shaiba in June (breeding) and in August ; Logan Home at Rumailah on June 5th saw half grown young ; Cheesman saw it near Nasariyeh, and Harrison at Ramadi in October. Pitman came across it twice, west

* He clearly considered (Ibis, 1892, p. 61) that the Punjab *arvensis*, the "big grey Skylark" which comes to the plains in winter, was *dulcivox*.

of Museyib, June 12th and a few miles west of Baghdad on May 28th, the only trans-Euphrates record. Cumming got it at Fao and Woosnam records it from the coastal plain of N. W. Bushire. It is probably resident where it occurs, and a true denizen of bare desert. Buxton notes that at Shaiba the desert is very slightly covered with pebbles, otherwise it resembles the desert in other parts of the plain. It is rather remarkable that its range should be so restricted, but in Sind I have found it a very local bird, so possibly it may yet be proved to inhabit other parts of the plain, indeed Zarudny records it from his " Mesopotamian region " which in this paper I have referred to as Karun district. Cheesman says he was often deceived by the note of this bird which is like the whistle of a school-boy.

Eight specimens examined : ♂ Shaiba, 1-6-18, ♀, 5-9-16, ♂, 11-9-16 (P. Z. C. and R. E. C.); ♂ Shaiba, 12-8-18, 22-8-18, ♀, 12-8-18 (P. A. B.); 2 Fao in B. M.

The worn breeding birds are very grey above ; August birds in moult, with body feathers almost perfect, vary much in colour ; a male, shot on the same day as a female in similar state of plumage, is much more washed with grey on the upperparts than the latter, in which sandy isabelline predominates ; so that evidently one must be very guarded in depending on colouration in determining the races of these birds, and not only does individual variation have to be considered but the effect of wear, as in time the grey wash and the isabelline tone both get worn off leaving a pronounced grey colour. These birds match a series from Karachi very well. Wings ♂ 132-138, bill (exposed) ♂ 26-28, from base 32-33, ♀ 24-25, from base 30·5 mm. These are smaller measurements than Hartert gives (Vög. Pal. F., p. 251), but I find Karachi birds measure almost precisely the same.

44. Shore Lark. Eremophila alpestris.

Eremophila alpestris bilopha, Temm. (Pl. Col., 244, 1823—Akaba in Arabia)

Pitman was the only observer who came across the Shore Lark in Mesopotamia ; he first noted a flock of six on December 12th, feeding on the parade ground at Samarra away from the Sky and Short-toed Larks. He saw others at the same place in January and also a flock of 20 or 30 out in the desert near the camp, while on February 9th, a large flock was met with at Daur.

Five specimens examined : ♂ ♂ ♀ ; Samarra, 30-12-17, ♂ ♀, 12-12-17 (C. R. P.). I cannot separate these from specimens from Algiers, Tunisia, Morocco and the Dead Sea. Wear often makes the upperparts a more orange-rust colour and less vinaceous pink.

45. Water Pipit. Anthus spinoletta.

(1) *Anthus spinoletta blakistoni,* Swinh. (P. Z. S., 1863 p. 90—R. Yangtze, China).

(2) *Anthus spinoletta coutellii,* Savig. (Desc. de Egypte, XXXIII, p. 360, 1828—Egypt).

There are remarkably few field notes about the Water Pipit, which is a fairly common winter visitor. A fair number winter in Mesopotamia but more are to be met with at the times of spring and autumn migrations, coming from and going to places further south. Buxton noted it as common in flooded places on the grass farm at Amara in November and December, and I found it common though exceedingly wild in similar situations at Basra in November. The spring passage appears to take place during the last week in March.

Sassi records *coutellii* from Mosul in January and Zarudny both races in the Karun district as winter visitors and passage migrants.

Thirteen specimens examined : *blakistoni*-- ♂, Amara, 7-11-17, 10-12-17, 26-2-18, ♀, 7-11-17; ♂ ♀, Baghdad, 22-3-18; ♂, Kurna, 17-3-18; Aligharbi,—3-3-18 (P. A. B.); ♂, Sheik Saad, 25-3-17 (P. Z. C. and R. E. C.) *coutellii.* Sheik Saad, 23-3-17, ♂ 22-3-17 (P. Z. C. and R. E. C.) ; intermediate ♂, Twin Canals, 2-12-16 (P. Z. C. and R. E. C.); Hawi Plain 13-12-17 (C. R. R.).

The majority are *blakistoni*, so apparently this race is the commoner. I have examined a large series of both races from topo-type localities and it is by no means easy to separate out individual birds ; the most typical *coutellii* with the warmer brown upperparts, especially the rump, come from Egypt and Persia ; probably the breeding area of this race is small compared with that of *blakistoni*, which has an enormous breeding range in Central Asia and is a very wide migrant. So that it is not to be wondered at that numerically *coutelli* gets swamped by its paler ally in its winter quarters. Of the thirteen specimens I regard nine as *blakistoni*, two as *coutellii* and two are somewhat intermediate between the two.

I find no difference in size in these two races ; a topo-type series of *blakistoni* measure 84-93 mm. (often 92-93), of *coutellii* 82-94 mm.

46. Meadow Pipit. Anthus pratensis.

Anthus pratensis, L. (Syst. Nat. Ed. X, p. 166, 1758—Sweden).

The various Pipits were so mixed up by so many observers that their status is a matter for further investigation. The Meadow Pipit would appear not to be very common, neither Buxton nor Cheesman met with it, nor did Cumming at Fao. Pitman obtained four skins at Samarra between December 14th and March 8th and I found it not uncommon in small flocks frequenting damp places in fields at Basra on November 20th and March 19th and obtained specimens on each day.

Zarudny records *A. pratensis enigmaticus* as a winter visitor and passage migrant in the Karun district. I do not know this bird, which Zarudny described from Tashkent in Turkestan ; the Mesopotamian birds agree well with European ones, and I suspect *enigmaticus* is really *cervinus*, which Zarudny omits from his Mesopotamian list.

47. Tree Pipit. Anthus trivialis.

Anthus trivialis trivialis, L. (Syst. Nat. Ed. X, p. 16, 1758—Sweden).

Cumming records this Pipit at Fao on spring and probably autumn passage. Pitman found it fairly common at Nahr Umar on March 26th, 1917, and obtained specimens there and at Feluja on March 29th the next year ; Cheesman obtained one at Basra on April 18th, Buxton records it from Amara on September 28th. Zarudny records it as a passage migrant in the Karun district and Weigold notes it on passage on April 10th as not rare in the oasis and gardens at Urfa, where there were still some on April 27th ; they were in flocks and the sexual organs were not developed. It breeds on the south coast of the Black Sea (Woosnam).

48. Red-throated Pipit. Anthus cervinus.

Anthus cervinus, Pall. (Zoog. Rosso-Asiat. i., p. 311, 1827—Siberia).

One obtained by Cheesman at Sheik Saad on April 3rd and two shot by Pitman at Feluja on April 16th, where he found it plentiful from 14th—17th., are our only records. Tomlinson records that he obtained one at Shustar on April 19th, and one at Basra on November 21st.

49. Tawny Pipit. Anthus campestris.

Anthus campestris campestris, L. (Syst. Nat. Ed. X, p. 166, 1758—Sweden).

The Tawny Pipit is a common winter visitor to the plains. Unlike most of the other Pipits it affects dry places and is to be met with in scrub, and desert where a little scrub is to be found ; it is found singly or at the most in pairs. It occurs from Fao and Shustar in the south northwards everywhere in suitable localities and Weigold records it from Urfa. The dates of arrival were not noted but there are specimens obtained as late as April 5th and Weigold met with it as late as the 23rd. According to Woosnam it probably breeds at Lake Van in Armenia.

Six specimens examined: ♀, Amara, 16-1-18; ♂, Legait, 2-3-18 (P. Z. C. and R. E. C.); ♀, Feluja, 29-3-18; Nahr Umar, 5-4-18 (C. R. P.); ♂, Amara, 23-12-17—16-12-17 (P. A. B.).

All belong to the typical race.

50 Richard's Pipit. Anthus richardi.

Anthus richardi richardi, Vieill. (Nouv. Dict. d'Hist. Nat. XXVI, p. 491, 1818—France).

Recorded by Zarudny as a winter visitor to the Karun district.

51. Plain Pipit. Anthus sordidus.

Anthus sordidus decaptus, Meinerz. (Bull. B.O.C. CCLIII, p. 23, 1920—Rud-i-Taman, E. Persia).

Apparently a winter visitor in quite small numbers, as there is only one specimen—obtained by Buxton at Amara on February 11th; he met with three or four in a ploughed field and remarks he had not seen it before. No one else records it but some may have mistaken it for the Tawny Pipit to which it bears some resemblance in general appearance and habits. Zarudny records it from the Karun district in winter.

Hartert (Vög. Pal. F., p. 269) separated the Palestine race of this Pipit as *A. leucophrys captus*. It is now generally recognized that it must stand as a race of the N. E. African bird, *A. sordidus*. Hartert gave the distribution of *captus* as Palestine, Persia, Afghanistan, Beluchistan and Sind. Meinerzhagen who recently got a good series of these birds in Palestine has pointed out however that the Palestine birds are smaller than those from further east and gives the wing measurement of the Palestine birds as 90-95mm. and in the eastern race, which he calls *decaptus*, the wing measures 95-106 mm. Buxton's bird, a female, has a wing of 97 and so clearly belongs to the eastern form.

52. Grey Wagtail. Motacilla cinerea (=boarula auct.).

Motacilla cinerea cinerea, Tunst. (Ornit. Britain, p. 2, 1771—Gt. Britain).

A winter visitor in small numbers, the first arriving at the end of August, and it is widely distributed in suitable places throughout our area. Most depart by the end of March and the latest date is April 11th; before they leave they assume full breeding dress. Weigold got three skins at Urfa in April and records that they are intermediate between *cinerea* and *melanope* and possibly an intermediate form occurs on the boundary between these two races, as the tails of his specimens, somewhat abraided, are shorter (93-95 mm.) than in any *cinerea*. He does not know if the Grey Wagtail breeds at Urfa.

Five skins examined: ♂ Kurna, 20-3-18, T. 100 (P. A. B.); ♂, Sheik Saad, 22-3-17, ♂ T. 98, 2-4-17, T. 98·5; ♂ Shaiba, 13-9-16, T. 100 (P. Z. C. and R. E. C.); Samarra, 13-12-17, T. 97 (C. R. P.).

None of these differ in any way from and all have as long tails as British ones.

53 Black-headed Wagtail. Motacilla feldegg (melanocephala auct). "Zit-ziata."

Motacilla feldegg feldegg, Michah. (Isis, 1830, p. 812—S. Dalmatia).

This Wagtail is an exceedingly abundant passage migrant throughout the country; the earliest date is March 13th and fair numbers may be seen throughout the rest of the month. Cheesman saw flocks of Wagtails, many being of this species going north at Sheik Saad in the third week of March, the males preceding the females. Huge flocks pass through in April but most have gone on by the third week. It probably breeds not far off as Pitman saw it at the Euphrates Barrage on July 8th, 1917, and many at Baghdad on the 18th.

Buxton also found a few in rice-fields by the Hawazieh swamp on July 12th and one obtained was an adult male in very worn dress and just beginning to moult.

Magrath too found it on the Saweikieh marsh in short grass in mid-July while Logan Home records three or four seen and one shot (unfortunately the skin was lost) at Abu Aran, 40 miles from Busra, on June 26th. So it is quite within the bounds of possibility that it even breeds in the plains. Zarudny says it breeds in the Zagros and winters on the Karun; we have no winter records.

During their passage they affect any damp ground, particularly crops such as wheat, grass, rice, etc., and associate with other Wagtails. Curiously enough there are no specimens or records in autumn but the latter may be included under *flava*.

Nine specimens examined: ♂ ♀ Amara, 24-3-18; ♂, Kurna, 17-3-18; ♂ .Hawizieh, 12-7-18 (P. A. B.); ♂, Sheik Saad, 27-3-17, 20-3-17, ♀ 25-3-17 (P. Z. C. and R. E. C.); ♂ Feluja, 21-3-27 (C. R. P.).

Wings 82-85. Tail 70-76 m.m.

The white chin and moustachal streak in *melanogriseus* are rather inconstant characters and some *feldegg* shew them; *melanogriseus* usually has a shorter wing and tail; thus within the range of both forms one may meet with single birds which are indeterminable and one or two of the above could not be picked out from a series of *melanogriseus*, possibly both races *do* occur, but a larger series are required to determine this.

I think it is perhaps better to treat the Black-headed Wagtails as a separate species and not as a race of the Blue-headed.

54. Blue-headed Wagtail. Motacilla flava.

(1) *Motacilla flava dombrowskii* (Tschusi) (Orn. Jahrb, xiv, 161, 1903—Roumania).

(2) *Motacilla flava thunbergi*, Billb. (Synop. Faun. Scand., 1, 2, Aves 1828, p. 50—Lappland (*borealis auct*).

(3) *Motacilla flava campestris*, Pall. (Russ. Reichs, iii, p. 696, 1776—E. Russia).

(4) *Motacilla flava flava*, L. (Syst. Nat. Ed., x, p. 185, 1758—S. Sweden)

(5) *Motacilla flava leucocephala* ?, Przew. (Zap. Imp. Akad. Nauk. St. Petersb. ,Lv., p. 85, 1887—Dzungaria (Altai).

The records are not always separable into the different races unless born out by specimens. The commonest form would seem to be *dombrowskii* and all races are passage migrants.

(1) This race appears on passage about the same time as *feldegg* and mixes freely with it. Cheesman found it common at Sheik Saad in the last week of March and obtained specimens. Pitman got four at Feluja during a big rush of mixed Yellow Wagtails on April 15th to 18th. Yellow Wagtails of sorts were passing along the line of the Jebel Hamrin range at Fatah Gorge on April 18th. On the return passage Yellow Wagtails were noted in the first week of August and became commoner in the second and third weeks.

Many pass in September; Cheesman noted the gardens at Sheik Saad full of them on the 14th, and on 16th at Shaiba, flocks were travelling *north* low over the desert against the wind, these had probably made a turn in their migration to gain the river and avoid the desert.

Pitman saw flocks passing near Baghdad going S. E. on September 9th and again at Adhaim on 24th. Buxton noted many passing through Kut during the first week in September and many at Amara during the third week and up to October 3rd; after this there are odd records up to the 10th. Other forms are doubtless included in the above autumn notes.

About 15 skins of this race examined: ♂, Baghdad, 18-9-17, 19-9-17; ♂, Amara, 14-9-18, 9-9-18. (P. A. B.); ♂, Sheik Saad, 27-3-17; (two) 31-3-17, (two) (P. Z. C. and R. E. C.); ♂ ♀, Feluja, 17-4-17, ♂ 16-4-17, and several other females on same date as males.

The males in spring are very distinctive; the white chin is fairly constant, white moustache rather variable, supercilium broad and distinct (noticeable in the field), sometimes tinged with yellow; ear-coverts are very dark blackish-slate mixed with white. The females which I have presumed to be of the race have a clear supercilium white or buffish white; dark brown lores, ear-coverts and head. The adult male in autumn is not unlike the spring bird, but the head not so pure a dark grey, ear coverts dark brown mixed with a little white and the yellow breast has a gorget of dark spots, as in many other forms.

(2) Records of this race cannot be picked out. Probably it is fairly common at the same times of passage as the other Wagtails.

Buxton obtained two males at the Hamar Lake on May 18th from a party and Pitman got one at Feluja on April 14th, one obtained by Buxton at Baghdad on October 3rd I am inclined to think belongs to this race; it is a male with brown head and ear coverts, a white throat and hardly a trace of any supercilium.

(3) All that can be said of this race is that it is a fairly common passage migrant along with the other forms. Cheesman obtained one at Sheik Saad on March 27th when many Wagtails were on passage and two at Amara on April 19th and 20th where, with Buxton, he found them abundant in young wheat. Venning obtained one at Sheik Saad on April 11th. All these are adult males quite easily recognized of course by the large amount of yellow on the head. Two obtained by Buxton at Amara on September 9th I attribute to this race, the chin and supercilium are yellow and the head brown tinged with yellow.

(4) Apparently the typical form is rare; I can only attribute to this race one obtained by Cheesman at Sheik Saad on April 3rd, yet this is the only form of Blue-headed Wagtail mentioned by Zarudny!

(5) I only include this to draw attention again to this remarkable form (if a good race it be and not a partial albinism). Pitman says that at Feluja on April 16th among the thousands of Yellow Wagtails present he saw two birds which corresponded exactly to the description of this bird, that is, a Blue-headed Wagtail in which white, or nearly white, replaces the blue of the head and ear-coverts. Unfortunately he did not obtain it. This race is so rare that one cannot help being suspicious that it is only a partial albinism of a commoner race.

55. White Wagtail. Motacilla alba.

(1) *Motacilla alba alba,* L. (Syst. Nat. Ed., x., p. 185, 1758—Sweden).
(2) *Motacilla alba dukhunensis,* Sykes (P. Z. S., London, 1832, p. 91—Deccan of India).
(3) *Motacila alba persica,* Blanf. (E. Persia, ii, p. 232—Niriz, east of Shiraz).

White Wagtails are abundant winter visitors to the whole of our area. The first arrive in the first days of October but it is not until the latter half of the month that they become numerous, and then in suitable localities settle down singly or in quite small parties for the winter. Probably also it is a bird of passage as Pitman at Kut noted an increase early in March; by the end of this month they have become quite scarce again but a few may be found well on into April and according to Cumming at Fao occasionally early in May. This species was a constant attendant at the trenches, attracted by the hosts of flies and was but little perturbed by gun fire.

Races of course were not distinguished in the field but I think it can be safely said that the European race is the commonest; Witherby referred most S. W. Persian birds to *alba* as does Sassi 6 skins from Mosul.

Eleven skins examined:—*Alba,* ♂, Amara, 12-12-17; Baghdad, 6-10-17; ♀ Azizieh, 17-11-18 (P. A. B.); Shustar, 8-2-18; (F. M. B.) Sheik Saad, 26-3-17 ♀, 4-4-17, ♂, 10-2-17. (P. Z. C. and R. E. C.). *Dukhunensis*—Amara, 11-2-18; ♀, Baghdad 31-3-18, (P. A. B.) Sheikh Saad, 18-12-16 (P. Z. C.) and R-E. C.; Shustar n. d. (F. M. B.).

These specimens of *dukhunensis* have rather paler upperparts and *much* broader margins of white on the coverts and tertials than *alba* has. Other races were reported by various observers at different places, but in the absence of specimens I must omit *personata* altogether and the same remark applies to *lugubris*. which Meinerzhagen (Ibis, 1914, p.390) said he found to be common—a bird *most* unlikely to occur. However *persica* certainly occurs at Ahwaz; Woosnam got one there on February 27th and Zarudny records it as a winter visitor.

56. Large Rock Nuthatch. Sitta neumayer.

Sitta neumayer dresseri, Zar. and But. (Orn. Monats, 1906, p. 132—Mountains of S. W. Persia).

Buxton found Rock Nuthatches common in the gorge of the Diala river, where it cuts through the Jebel Hamrin, on November 22nd and Cheesman obtained this race at Kasir Sherin on May 22nd just over the Persian frontier in this district. Probably it occurs in suitable places all along the Jebel Hamrin as Baily obtained it at Shustar on February 7th. Cheesman found them in pairs on overhanging rocks near the rivers and says their call is like that of the English Nuthatch only louder.

Zarudny says it is resident in the Karun district, in the hilly parts only of course.

One skin examined: Shustar, 7-2-18 (F. M. B.). Wing 90, Bill from base 28·5mm.

57. Small Rock Nuthatch Sitta rupicola.

Sitta rupicola tschitscherini, Zar. (Orn. Jahrb., 1904, p. 218—Ispahan).

This species, which in some parts at all events lives alongside the Large Nuthatch, is recorded by Zarudny as a resident in small numbers in the Karun district. We have no certain records of it. For a full account of Persian Rock Nuthatches, *see* Bull. B. O. C. ccli, pp. 135-9, where Buxton points out the very interesting fact that in N. W. Persia there are two kinds differing much in size but not in colour and in S. W. Persia these are replaced by two very pale subspecies also differing from each other in size but not in colour.

58. Great Tit. Parus major.

Parus major blanfordi, Prazak (Orn. Jahrb. v., p. 240, 1894—Teheran in Persia).

The Great Tit only occurs so far as we know at present in the Khusistan part which for zoological purposes I have included in Mesopotamia. Cheesman met with a family party at Shush in willow jungle by the Kerkha river where it evidently breeds. Woosnam also obtained it at Dizful and Shush in March. Zarudny gives it as a winter bird in this area.

Zarudny and Loudon (Orn. Monat., xiii, 1905, p. 108) separated the Great Tit of S. W. Persia (type locality Zagros Mts.) as *zagrossiensis* and gave a number of characters by which it differed from the typical race, *P. major*, of Sweden. I must here point out and protest against what is a not uncommon practice amongst some continental (and even some British) ornithologists and that is comparing some supposed new race, *not* with its nearest ally, but with something totally different. Now all Great Tits from the Persian plateau south to Khuzistan differ very markedly from Swedish birds and it is fairly obvious that, if birds from the Zagros are thought to be different to the former, it is with the Teheran *blanfordi* that they should be compared, and not with the Swedish birds.

Now I have compared 15 birds from Shush, Dizful, Shiraz, with a dozen or more from Teheran, Kasvin, Kermanshah, and I cannot see the slightest difference between the two series. The differences which Zarudny and Loudon give between *zagrossiensis* and *major*, when applied to the former and *blanfordi* I find either hold good in both or are inconstant in both. I consider that *zagrossiensis* is a pure synonym of *blanfordi*.

Great Tits from the South Caspian forest I consider to be inseparable from the typical form, an opinion I believe Buxton independently has come to.

59. Penduline Tit. Anthoscopus pendulinus.

Anthoscopus pendulinus persimilis, Hart. (Novit, Zool., xxv., p. 308, 1918—Eregli, Asia Minor).

The Penduline Tit appears to be a rare winter visitor to Mesopotamia. Buxton met with a family party in a *ziziphus* tree in a garden at Amara on October 25th and another party at Ali Gharbi on poplar scrub on November 17th. Venning obtained one at Busra on April 21st.

Three specimens examined. This Tit appears to take 15 months to become adult, that is to say, to become adult at the second autumn moult, unless it has a spring moult, of which I have seen no evidence in a good many examined. Two of the above specimens are in the first winter dress without the distinctive adult markings; the Basra bird is adult, but nearly all the feather on the head have slipped! so that the determination of the race is a difficult matter. They certainly do not belong to the typical race as they are too small and pale. They also are not *jurartensis*. They agree very well with Hartert's *persimilis*, specimens of which from Kaisarieh and Lake Urmia I have compared them with, in size of wing, paleness, and, as far as I could make out in the single adult, in their having the chestnut line above the black forehead very narrow. Zarudny has not made matters any easier by recording the typical form and *P. caspius* as winter visitors to the Karun district and afterwards (Mess. Orn., 1913) describing a new race, *menzbieri*, from the same district! According to him *menzbieri* has a *wider* frontal chestnut band than the typical race which *persimilis* certainly has not. There appears to be no proof that any *Anthoscopus* breeds in the Karun district.

60. Lesser Grey Shrike. Lanius minor.

Lanius minor, Gm. (Syst. Nat. I., p. 308, 1788—Italy).

This is a passage migrant in small numbers from Urfa in the north to Fao in the south where Cumming noted it as passing in March to May and again in September; most appear to pass through in the last half of April. It comes back again early, during the third week of August, and the passage lasts until the third week in September. Possibly some breed in Mesopotamia as Sassi records one from Pechabour near Mosul on June 1st. Zarudny says it nests in small numbers in the Zagros.

Specimens examined: ♀ Sheik Saad, 14-4-17; Tekrit, 17-4-19. (P. Z. C. and R. E. C.); ♂, Amara, 14-9-18 (P. A. B.); ♂ Basra, 20-8-19 (L. Home).

61. Great Grey Shrike. Lanius excubitor.

(1) *Lanius excubitor pallidirostris*, Cass. (Proc. Acad. Philad. v., p. 244, 1852—E. Africa).=*Assimilis* auct.)

(2) *Lanius excubitor aucheri*, Bp. (Rev. and Mag. Zool., 1853, p. 294—Persia)=(*fallax* auct).

The status of the Great Grey Shrikes of Mesopotamia is rather obscure; records refer to Grey Shrikes without discrimination of races of course, and some may even refer to the Lesser Grey Shrike, so that I must go almost entirely on skins. Of fourteen specimens examined three are *aucheri* and the rest *pallidirostris*; all were obtained in winter.

The Great Grey Shrike is probably a winter visitor, a few arriving in September, most of them early in October. Cheesman obtained *pallidirostris* at Shaiba on September 11th and Cumming got one at Fao also in September (erroneously recorded by Sharpe as *fallax*). All the others were got between October and February though Grey Shrikes are noted up to March 8th. They are widely distributed, singly and sparsely, inhabiting gardens but more especially thin scrub on the desert, or even quite bare desert. Of the 3 examples of *aucheri*

Photo Capt. W. Edgar Evans, 1918.

A.—Close to Amara, on Tigris.
"Borrow-pits" where earth for brick making, &c., is dug; old and new kilns in distance. Some of the faces where the Bee-eaters and Pied King-fishers nested in 1918 are seen to right and in distance. Average height 6 to 7 feet. All the surrounding land is a mass of the borrow-pits.

Photo. Capt. C. R. Pitman.

B.—Broken country on Tigris down stream of Samarra where the Ruddy Sheldrake is found breeding in holes in the ground, mounds and cliffs during April and May.

two were obtained in October and the third bears no date. It seems certain that some kind of Grey Shrike nests in the Mesopotamian plain. Pitman records it between Baghdad and Musejib from July 14th onwards frequenting telegraph wires near some gardens, and Logan Home says he found an unfinished nest at Samara, whilst Livesay took Grey Shrikes' eggs. I must here remark that it is perfectly useless taking the eggs of any Grey Shrike without obtaining the bird, and it may even be misleading.

Zarudny records *aucheri*, *pallidirostris*, and *assimilis* (which he considers to be distinct from the latter) as winter visitors to the Karun district and *pallidirostris* as a resident on the Zagros.

(1) Kumait, 27-2-18, 13-11-17, ♂ Amara, 16-12-17 (P. A. B.); Shaiba, 11-9-16 (P. Z. C. and R. E. C.); Shat-al-Adhaim, 3-10-17, 8-11-17; Baghdad, 31-12-17 (C. R. P.).

(2) Baghdad, 10-10-17 (P. A. B.); Shat-al-Adhaim, 3-10-17 (C. R. P.).

Aucheri have a distinct but narrow frontal line of black, grey on the sides of the breast and a large wing spot and usually no pink tinge on the breast; in *pallidirostris* the pink tinge on the breast is well marked as a rule unless faded, no frontal black, smaller or no wing spot, usually paler upperparts and a more distinct supercilium; the young birds in winter have the grey of the back overlaid with a pale sandy colour and appear to lack the dark crescent markings most other races shew.

62. Woodchat Shrike. Lanius senator.

Lanius senator niloticus, Bp. (Rev. Zool., 1853, p. 439—White Nile).

This is a much earlier passage migrant in spring than the Masked Shrike and occurs in smaller numbers. Buxton first saw a few males at Amara on March 13th and after that date there are numerous records throughout the plains up to April 27th. The first autumn record comes from the oasis of Shaiba on August 9th and the passage lasts up to the middle of September, again no great numbers being recorded. Tomlinson in remarking that the species is not uncommon in spring says it also probably breeds up the Karun river as he saw it there early in June. Zarudny does not record it as nesting there, but says a few winter there! Here again, as so often, our records do not at all tally with Zarudny's. Woosnam got one on the Shuteit River on March 8th. The status of this and other Shrikes in the breeding season requires further investigation. Zarudny says it breeds commonly in the Zagros.

Ten specimens examined: Amara, 18-4-19 (L. Hoome); Amara, 13-3-18; ♂, Basra, 19-8-19; ♀, Kurna, 17-3-18 (P. A. B.) ♂, Baghdad; 19-3-18 (Harrison); ♂, Shaiba, 8-9-16; ♂. Sheik Saad, 5-4-17 (P. Z. C. and R. E. C.), 2. Feluja, 27-4-17 (C. R. P.); ♀, Basra, 17-3-18 (C. B. T.).

All are typical *niloticus* with much white at the base of the tail; only in one does the white *not* extend beyond the coverts.

63. Masked Shrike. Lanius nubicus.

Lanius nubicus, Licht. (Verz. Doubl., p. 47, 1823—Nubia).

This species is a common spring and autumn migrant; first few noted on April 17th at Tekrit and Urfa; at Feluja and Amara a sudden and marked influx took place on the 23rd and for a fortnight it was quite common. It occurs throughout the region south to Fao. The return passage takes place at the end of August and lasts till the third week in September. Pitman noted that this Shrike was shy and retiring making all use of thick foliage for concealment, not a usual habit in Shrikes, and not universal with this species. Possibly a few pairs remain to breed in the plains as Buxton records it in the first two weeks of June at Amara and on June 17th saw a bird carrying food or nest material. Ward (*Field*, Jan. 18th, 1919) records it as common at Samara breeding in the scrub. Zarudny says it breeds commonly in the Zagros.

Eleven skins examined : ♂, Basra, 19-4-17, ; ♂, Sheik Saad, 31-4-18 (P. Z. C. and R. E. C.) ; ♀, Amara 23-4-18, 1-5-18 ; ♂, Baghdad, 12-9-17 (P.A. B.) ; Basra, 6-5 19 (L. Home) ; Feluja, ♀, 23-4-17 (two), 27-4-17 (C. R. P.) ; ♂, Sheik Saad p. 2-5-17 (Robinson) ; Baghdad, 7-9-17 (Ingoldby).

64. Red-backed Shrike. Lanius collurio.

Lanius collurio, L. (Syst. Nat. Ed., x., p. 94, 1758—Sweden).

The Red-backed Shrike is also a passage migrant in large numbers. The first few males arrive in the last days of March and small numbers are to be met with throughout April, but it is not until towards the end of the month and the early part of May that they pass through in any quantity, when they become very common and are widely distributed. The return passage begins in the last days of August and they quickly become common and soon pass on, our latest date being September 24th, though Cumming at Fao recorded it up to mid-November. Weigold found it common on spring passage at Urfa and remarks that of his numerous specimens some are typical *c. collurio*, some typical *c. kobylini* and four are intermediate. This latter race was named by Buturlin (Ibis, 1906, p. 416—Kutais in S. Caucasus) as Zarudny's name *fuscatus* for the eastern race was preoccupied, but I must point out that Zarudny in employing this name used *Enneoctonus* as the generic name, and that if this genus is used for the Red-backed Shrike, as it is by some, Zarudny's name must be upheld ; if however *Lanius* is preferred then Buturlin's name should stand. On points like this, and they are always arising, there can never be any uniformity of nomenclature or finality, unless every one agrees on the limitations of genera !

This supposed eastern race is said to differ in the rather paler and restricted amount of the chestnut colour of the mantle. As Weigold remarks one often cannot measure this as it is quite indefinite where the colour begins and ends, and as he says some are intermediate. The truth is *kobylini* is a thoroughly bad race !

I have examined six spring males from Kutais, Caucasus and North Persia and about eight spring males from Mesopotamia (which one may suppose should also belong to this race), together with a large series of European males and I find that the shade of the chestnut colour and its width vary very much both in eastern and European examples ; it so happens that in the Kutais birds it is broad ! and in the Caucasian bird very dark ! I cannot see any distinguishing character between birds from the east and west ; the bills too vary very much in size throughout the range of the species.

Seventeen specimens examined : ♂ ♀, Amara, 7-5-18, ; ♂ ♂, Baghdad, 31-8-17, ♂, 24-9-17; ♀, Amara, 6-5-18, 16-4-19 (P. A. B.) : ♀ ♀, Fao, 10-5-18 (Armstrong) ; ♂, Feluja, 24-4-17, ♂, 21-4-17, ♀, 23-4-17 (C. R. P.) ; Basra, 6-5-19 (L. Home) ; Tekrit, 17-4-19, ♂, Sheik Saad, 10-9-17 (P. Z. C. and R. E. C.) ; ♂, Sulimania, 2-9-17 (Ross).

65. Red-tailed Shrike. Lanius cristatus.

(1) *Lanius cristatus isabellinus*, H. and E. (Symb. Phys. fol. c. Anm., 1828—Gonfode in Arabia).

(2) *Lanius cristatus phœnicuroides*, Schal. (J. F. O., 1875, p. 148—Tschimkent).

The two races were naturally not identified in the field and records are scanty ; judging from specimens obtained *isabellinus* is a common winter visitor arriving during the last ten days of September, though one or the other form occurs at the beginning of the month. It frequents thorny scrub or gardens singly, or two or three in near proximity ; it leaves again somewhat late in the spring (the latest specimen is April 29th), completing its body moult in February and March before departure.

All the specimens (six) of *phœnicuroides* were obtained during the spring and autumn; Pitman noted that Red-tailed Shrikes were abundant in the Adhaim area in the first ten days of October and after that only a few were seen; three specimens he obtained about that time were *phœnicuroides* and as no specimens were got between October 12th and early April, during which period 8 specimens of *isabellinus* were obtained, it is extremely suggestive that the former is only a bird of passage—as I know to be the case elsewhere. Since all Red-tailed Shrikes were found commoner in spring and autumn, *isabellinus* may too be in part a passage migrant. *phœnicuroides* was obtained at Fao as late as May 25th; it nests in the Zagros according to Zarudny. From a specimen of *isabellinus* I took a parasitic worm from under the skin behind the eye, a situation I have often found similar parasites in *collurio*. Dr. Manson Bahr informs me this is a *filaria* and the intermediate host is the feather louse.

Zarudny goes to far extremes in the recognition of racial forms and in some cases at all events his "races" are nothing but individual variations; this "oversplitting" and lack of proper conception of what a racial form is brings this important part of ornithology into disrepute (there are still some who "do not believe" in the existence of the most obvious subspecies), and moreover gives an infinite amount of unproductive and needless toil to those who later work in the same field; work which in some cases is impossible as his specimens are ungetable in Tashkent and many of his descriptions are written in Russian! His treatment of the Red-tailed Shrikes is a case in point. These Shrikes throughout their range divide into five fairly well marked races, two of which only concern us—*phœnicuroides* and *isabellinus* (both of which vary somewhat individually). These two Zarudny makes into full species:—*isabellinus* with two races, *speculigera* and *salina*; and *phœnicuroides* also with two races *caniceps* and *varia*—all six forms to be found in Persia and all except *varia* and *salina* inhabiting the Karun district in winter!

(1) Eighteen specimens examined: ♂, Amara, 25-10-17, 25-4-18, 26-10-18, 1-12-17, 5-1-18; ♂, Baghdad, 21-9-17; L. Akkarkus, 12-10-17; Ezra's Tomb, 23-2-18 (two) (P. A. B.); Abed, 9-2-18 (F. M. B.); Kamisiyeh, 7-1-17 (Aldworth); Feluja, 24-4-17, 29-4-17 (C. R. P.); ♂ ♀, Basra, 21-11-17 (C. B. T.); ♀, Sheik Saad, 31-3-17; ♂, Kut, 1-10-18 (P. Z. C. and R. E. C.); Gurmat Ali, 26-9-20.

(2) Five examined: ♂, Fao, 25-5-18 (Armstrong); ♂, Sheik Saad, 4-4-19 (P. Z.C. and R. E. C.); Adhaim, 2-10-17, 12-10-17, 27-9-17 (C. R. P.).

One *isabellinus*, 25-10-17, has much juvenile plumage still present. It rather resembles juvenile of *collurio*, but the tail is longer and there is no white on the outer web of the outer tail feathers and it is paler grey on the back.

(*To be continued.*)

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 30, 1921.

FURTHER LIZARDS AND SNAKES FROM PERSIA AND MESOPOTAMIA.

BY

JOAN B. PROCTER, F.Z.S.

Since the publication of Mr. Boulenger's lists of the Snakes and Lizards collected by the Expeditionary Forces in Mesopotamia[1], further material has been received from Capt. H. E. Shortt, I.M.S., and Capt. W. E. Evans, R. A. M. C.; Mr. Kinnear has therefore asked me to write the following addendum, in which species marked with an asterisk were not recorded by Mr. Boulenger.

Besides snakes and lizards, which are the subject of this paper, the following were included in the collections :—*Clemmys caspica* (Capt. Evans), *Bufo viridis* (Capt. Evans) and *Hyla arborea* var. *savigni* (Capt. Shortt and Capt. Evans).

LACERTITIA.

GECKONIDÆ.

1. *Alsophylax tuberculata*,* Blanf.

Jebel Hamrin, N. E. of Baghdad (Capt. Evans).

One specimen, well marked with alternate, curved transverse bands of light and dark grey; lower surfaces speckled with grey.

Habitat : Mesopotamia, Southern Persia, Baluchistan, Sind.

2. *Phyllodactylus elisæ*.* Werner.

Kuretu[2], Persian frontier (Capt. Shortt).

Three specimens of this rare gecko. They show considerable variation in the proportions and arrangements of the mental and chin-shields. In the case of the first specimen the mental is moderate, followed by two pairs of chin-shields, the first pair in contact in the middle for a distance equalling half their length, as in the type-specimens; in the second the first pair of chin-shields are only in contact for about one-quarter of their length, the mental shield being larger in proportion; in the third specimen the mental is enormous, followed by a single pair of large triangular chin-shields, which are not in contact with each other.

This amount of variation is very unusual, were it not for the intermediate form one might consider the third specimen to be a distinct species. The first specimen is almost white; the other two are thickly speckled with very dark brown.

Habitat : Mesopotamia. Capt. Shortt tells me that he caught these geckos in natural caves formed by overhanging rocks. The types are from the ruins of Nineveh.

3. *Hemidactylus persicus*,* Anders.

Baghdad (Capt. Shortt), Amara-on-Tigris (Capt. Evans), Three specimens

Habitat : Mesopotamia, Persia, Sind. A new Record for Mesopotamia.

4. *Hemidactylus flaviviridis** Ruppi.

One specimen from Amara (Capt. Evans).

Habitat : Arabia, Persia, Baluchistan, India and Malay Peninsula.

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[1] Journ., Bombay Nat. Hist. Soc., xxvii, No. 2, pp. 347 353 (1920),

[2] Also spelled Quritu or Quraitu.

AGAMIDÆ.

5. *Agama persica*, Blanf.

Two specimens from Amara (Capt. Evans).
Note by Capt. Evans:—

"This lizard had the power of producing the purple-blue colour under its face and neck, and along its sides; or of losing the colour entirely, except a faint rusty tinge on the sides only. The change could be accomplished in a minute or two. I had it alive for some time."

Habitat: Mesopotamia, Persia.

6. *Agama nupta*, De Fil.

One specimen from Jebel Hamrin (Capt. Evans).
One specimen from Kuretu, (Capt. Shortt).
Var. *fusca*,* Blanf.
One specimen, ♂ from Kangavar (Capt. Shortt).
This specimen must be regarded as var. *fusca* on account of the great development of the spines on the head and neck, and the indistinctness of the nuchal fold. Its colouration is different from the true *fusca*, being dark grey, mottled with black on the neck and shoulders; throat black instead of yellow; enlarged dorsal scales greenish grey.

Habitat: Mesopotamia, Persia, Baluchistan.

7. *Uromastix loricatus*,* Blanf.

One specimen from Ruz, N. E. of Baghdad (Capt. Evans).
Habitat: Mesopotamia, Persia.

A new record for Mesopotamia.

LACERTIDÆ.

8. *Acanthodactylus scutellatus*, Anders.

One specimen from Jebel Hamrin (Capt. Evans).
Habitat: Senegambia, North Africa, Somaliland, Sinaitic Peninsula, Syria. Mesopotamia.

9. *Ophiops elegans*, Mén.

Var. *ehrenbergii*, Wiegm.
Four specimens, from Kuretu, (Capt. Shortt).
Five specimens from Jebel Hamrin, Kizil Robat, and Abu Sidra on Tigris (Capt. Evans).

Habitat: Constantinople and Tripoli to N. W. India.

10. *Eremias velox*,* Pall.

Var. *persica*, Blanf.
One specimen from Kuretu (Capt. Shortt)
Habitat: Mesopotamia, Persia.

SCINCIDÆ.

11. *Mabuia vittata*, Oliv.

One specimen from Amara (Capt. Evans).
Habitat: Algeria to Mesopotamia.

12. *Mabuia septemtæniata*, Reuss.

One specimen from Kuretu (Capt. Shortt).
Two from Amara (Capt. Evans).
Habitat: Erythrea to Transcaspia and Sind.

13. *Ablepharus brandtii*, Strauch.

Five specimens from Amara, and three from near Kizil Robat, N. E. of Baghdad (Capt. Evans).

Habitat : Tunisia to Transcaspia and Baluchistan.

OPHIDIA.

COLUBRINÆ.

14. *Zamenis ventrimaculatus*, Gray.

One young, Baghdad (Capt. Shortt).

Two young from Amara (Capt. Evans).

One from Amara has the præfrontals fused into a single shield.

Habitat : From the Euphrates to Kashmir and N. W. India.

15. *Zamenis ravergieri*,* Mén.

One specimen from Kerind, Persia (Capt. Shortt).

This individual is jet black above, dark grey below, uniform.

Capt. Shortt says of it:—"Taken sunning itself in midwinter when the ground was covered with snow. I have seen the same snake also taken at Fatha Gorge on the Tigris."

Habitat : Transcaucasia, Mesopotamia, Persian Transcaspia, Turkestan, Afganistan.

16. *Contia collaris*, Mén.

One specimen from Tak-I-Girreh, N. W. Persia (Capt. Evans).

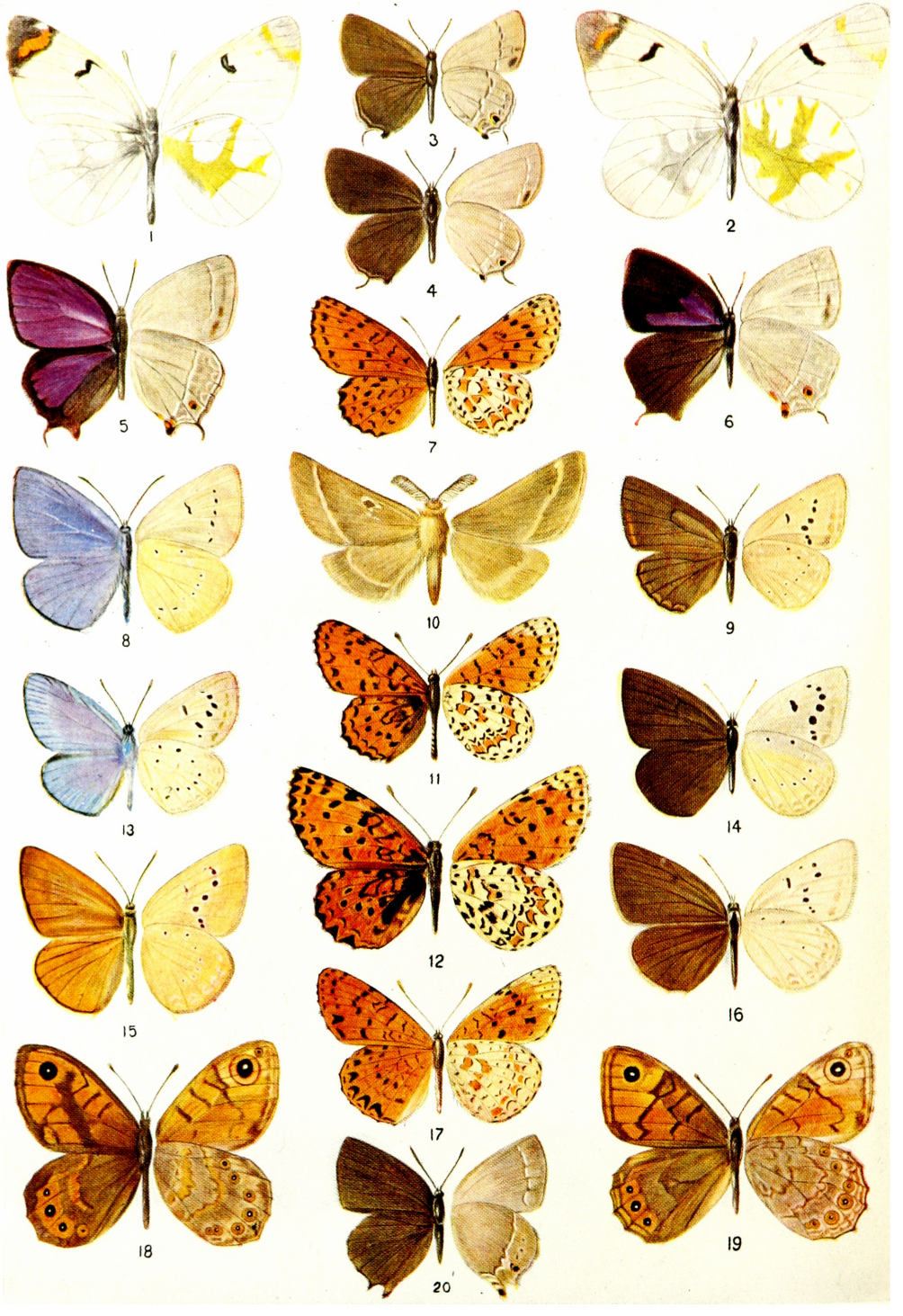
Habitat : Caucasus, Mesopotamia, Persia.

17. *Contia persica*,* Anders.

Two specimens from Kizil Robat and Jebel Hamrin hills, N. E. of Baghdad (Capt. Evans).

This rare little snake has not been recorded from Mesopotamia before.

Habitat : Mesopotamia, Persia.



Some new forms of Lepidoptera from Mesopotamia and N.W. Persia.

SOME NEW FORMS OF LEPIDOPTERA FROM MESOPOTAMIA AND N. W. PERSIA.

Explanation of Plate.

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The original for the Plate is by Mr. A. Terzi.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, MAR. 25, 1922.]

THE BUTTERFLIES OF MESOPOTAMIA.

BY H. D. PEILE, F.E.S.

PART II.

(*continued from page 70 of this volume*).

(With a Plate.)

PIERIDAE.

KEY.

A. Ground colour white—
- *a.* Underside h.w. no green markings.
  - a^1. U. h.w. veins not black bordered.
    - a^2. apex of forewing black above .. ..*Pieris brassicæ.*
    - b^2. apex of forewing plain above .. ..*Pieris rapæ.*
    - c^2. f. w. above, apical, markings slight; spot between veins 6 & 7 ; discal spot nearer termen .. .. ..*Pieris napi, pseudorapæ.*
    - d^2. Apex f. w. very pointed. U. h. w. yellow ; size small .. ..*Pieris ergane.*
  - b^1. U. h.w. veins broadly bordered with black.*Belenois mesentina.*
- *b.* Underside h.w. markings green.
  - a^1. U. h.w. green edging to terminal portion of veins clavate.. .. .. ..*Pontia daplidice.*
  - b^1. Underside h. w. with vein closing cell white or yellow, bordered with green..*Pontia glauconome.*
  - c^1. Underside h.w. green edgings to terminal portion of veins straight not clavate.*Pontia chloridice.*
  - d^1. U. h.w. white areas in form of spots not bands .. ..*Euchlœ ausonia.*
  - e^1. U. h.w. white and green transverse bands.*Euchlœ belemia.*
  - f^1. Underside h.w. uniform green except few minute white spots .. .. ..*Euchlœ transcaspica.*
  - g^1. A brown ringed silver spot in centre of h.w. beneath: cilia pink; black terminal band on h.w. .. ..*Colias croceus* ♀ *f. pallida.*
  - h^1. U. h.w. a green and yellow 4 branched patch occupying base and centre. Up f.w. apex grey usually enclosing an orange patch .. .. ..*Zegris eupheme.*

B. Ground colour yellow—
- *a.* Scalloped margin to wings, small orange spot in centre of each wing .. ..*Gonepteryx farinosa.*
- *b.* Brown ringed silver spot in centre of h.w. cilia pink. (f. d. helice has cream grd. col. varying in shade) .. .. ..*Colias crocea.*

C. Ground colour Salmon pink .. .. ..*Colotis fausta.*

GENUS BELENOIS, Hb. (ANAPHÆIS, Hb.)

B. mesentina, Cr. Seitz. 1.21d & e. F. B. I. (Bingham.) Vol. II, p. 156.

KEY : Colour white and black above. H. w. beneath, veins broadly bordered with black.

Several specimens were taken at Kizil Robat through November, in early December 1918 and at end of January 1919; and one at Khanikin, October 22nd, 1918, the black on the veins on the underside being well marked. One female was taken having cream ground-colour.

Food-plant—capers (*Capparis spinosa*).

It ranges from East Africa, through Arabia, Persia and India.

Larva (description abridged from Chaumette) grass-green; dorsal line dark green; lateral line very broad, plum coloured; a white spot on either side of dorsal line and a yellow spot on lateral line on each segment. Legs green hairy, head shiny black and green; segments black and hairy.

Localities:—Mesopotamia—Kizil Robat; Khanikin; and range as above mentioned. A female was taken at Kermanshah, N. W. Persia, on August 24th.

Of 9 ♂, 8 ♀ from Kizil Robat, Khanikin, Jebel Hamrin (Dyala), Fathah, and Kermanshah, Capt. Riley notes:—"All agree very well with the male described by LeCerf (Ann. d'Histoire Nat. 1913), but I do not consider they can be separated as a race. Only the wet form is represented. Specimens from Syria and Palestine are very similar, and also from Quetta, Kandahar, Baghdad, &c."

GENUS PIERIS, Sch.

P. rapæ, L. Sub-sp. **iranica**, LeCerf. Annales d'Histoire Naturelle 1913.

The "small cabbage white" is abundant along the banks of the rivers and in gardens generally in Mesopotamia. There are probably several broods in the year. Females were seen ovipositing on the upperside of the leaves of low growing plants in the third week of June at Baiji, and in November at Baghdad.

Of 73 ♂, 52 ♀ from Mesopotamia (Amara, Baghdad, Fathah, Jeble Hamrin, Khanikin, Kirkuk, & Kizil Robat.) and N. W. Persia (Harir, Karind and Kermanshah). 33 ♂, 31 ♀ of these are now in the British Museum collection.

Capt. Riley notes:—"A fine series, from every month in the year except August. The January-March forms are very different from the summer forms—May to November—and most nearly approach British Spring *rapæ*. Those from the transitional periods April and December compare well with the British summer form whilst the summer form in Mesopotamia and Persia are very different looking insects. The large bright yellow-green area at the base of the forewing below and the delicate brightness (contrasted with the rougher, greyer, winter forms) are very characteristic of it. The winter form has the forewing costa below broadly and evenly ochreous from base to the apical patch. Intermediate forms shew this breaking and gradually disappearing to the replaced by the basal green area mentioned above."

P. napi pseudorapæ, Verity.

15 ♂, 3 ♀ from Harir, 5,300 ft. and Karind Gorge, 16th July, 19th August 1918.

Two pairs taken in copula.

All except 2 ♂ now incorporated in B. M. collection.

Note by Capt. Riley:—"This is undoubtedly the form which LeCerf quotes Verity as calling the 2nd generation of *P. napi pseudorapæ*; '2nd generation' is a trifle misleading; what is meant is that this is the summer form. Unfortunately Col. Peile did not obtain the winter and intermediate forms, which resemble more the English forms."

P. ergane, Hubn, Seitz. Vol. 1, 20d.

Karind Gorge, 1 ♀, 13th August 1918; 3 ♂, 1 ♀, 19th September 1918.

Not previously recorded from any part of Persia, though taken in Upper Mesopotamia and Western Kurdistan.

GENUS PONTIA, Dab.

P. daplidice, L., Seitz. Vol. I. 21 f.

Of 88 ♂ and 50 ♂ examined (49 ♂, 39 ♀ of these are now in B. M.) Capt. Riley notes:—"Captures cover every month of the year except December, and shew very well the gradual transition from the small dark winter form, through the larger brighter spring and early summer forms, to the small and very pale midsummer forms and back again. The end of June and July show the 'driest' forms; in these the hindwing underside in the male is sometimes almost devoid of markings. January and February shew the darkest undersides, November closely approaching them."

The "Bath White" is here very common, and in June and July an extreme "dry" small stunted form occurs; the ordinary or "wet" form being then still found in the adjoining Persian hills where the climate is much cooler and more moist.

In Mesopotamia there appear to be at least four, probably more, broods in the year.

The *first* from about January 24th into February, is well marked with dark green beneath. The *second* from about 29th March into April, has the green, though still well marked, slightly less so and lighter in shade. This form is larger and more plentiful than the first. The *third* appears in May and continues into June and July, and is a stunted form with dense black markings above and very pale beneath in the male, the slight markings there being more yellow than green. The females though not so pale beneath have much yellow with the green, the veins often appearing yellow.

From August to October there may be another brood. The last brood appears about 2nd November, being common in mid November, and is well marked with green beneath.

On March 28th two small green cylindrical larvæ with lateral and dorsal blue bands and a yellow band between, and minutely dotted with black, the dots being more distinct than in the larvæ of *E. belemia*, were found on a yellow-flowered crucifer, and continued to feed on the seed-pods. One was accidentally injured but the other pupated head up on the upper side of the stem of the food-plant on 31st March about noon. This pupa was banded dorsally and laterally with bluish green and pale yellowish green in between these bands. There were two prominent points on each side and a very prominent median dorsal thoracic projection, so that it was rather *Pieris* like in shape. The whole of the body, thorax and head were spotted with black, the wing-cases being green. From this pupa a male *daplidice* emerged at 8-30 a.m. on 8th April. The markings of the forewings had been visible for a day previous to emergence.

At times this butterfly is very active and much on the move, but not so constantly on the wing as *E. belemia*. Although very active, while the sun is high, it is easily caught about sunset when about to settle for the night. Eggs were seen deposited on two kinds of yellow crucifer, and were laid both on young flower-buds and on leaves.

Localities:—Mesopotamia—Sheik Said and Amara, fairly common in gardens in April and May. Kizil Robat, on the Dyala, about old canal banks and gardens most of the year. Baiji near Fathah 1920, none observed until June when it became very common about lucerne and along the bank of the Tigris.

N. Persia: Harir, 5,300 ft., elevation and widespread in Europe, N. Africa, Asia Minor and on the North West Frontier of India.

P. glauconome, Klug. r. **iranica**, Bienert, Seitz. 1·20 f.

Upperside very similar to *P. daplidice*. Underside: veins conspicuously lined with yellow, and green markings proportionately less than in *daplidice*.

May be very easily passed over unrecognized owing to its close resemblance to the more common *daplidice*. especially as the green on the underside varies greatly in amount and in shade with the seasons. As with *daplidice* there are wet and dry season forms.

Wet season form, 25th January 1919, Mirjana (Kizil Robat).
Dry ,, ,, 8th June 1919 ,, ,,
,, ,, ,, 20th November 1918 ,, ,,

It ranges across the desert belt from N. and W Africa to Syria, Arabia, Persia and the Punjab. Larva described by Bingham as greenish yellow with 2 longitudinal yellow bands and 5 transverse lines of minute black dots on each segment; head yellowish green with black dots.

P. chloridice, Hb, Seitz., Vol. 1., Pl. 20 f.

Very similar to the common *daplidice* and easily mistaken for it: differs as stated in the Key.

Localities :—Mesopotamia—Khanikin, 22nd October 1918, one ♀ example.

The range of *chloridice* is given as S. Russia, Turkey and Chitral.

GENUS EUCHLŒ Hb.

E. ausonia, Hb. (till lately known as *belia,* L.). Subsp. **persica,** Verity, Seitz, Vol. 1, 22b.

Above white with black apical markings and black middle spot to forewing. Hindwing beneath silvery white with regular yellowish green markings, which are arranged as spots and not stripes as in *belemia.* The underside recalls *cardamines,* the English " Orange-tip. "

7 ♂, 7 ♀ (now in B. M.) and 8 others ; taken 19-30th March 1920.

Referring to these, Capt. Riley remarks :—

" Verity says of his type: 'La tache apicale, peu étendue, mais très noire et ā limites très nettes, rapelle plutôt celle de *belemia,* tandis que le trait discoidal très reduit, très droit et aussi éloigné de la côte que chez *falloui,* a un aspect qu'on nc retrouve chez aucun autre *Euchloë*; ce trait a la même ampleur sur les deux surfaces'.

This exactly fits the specimens collected by Lt.-Col. Peile, but its application by Verity to the specimens from Schahrud in the B. M. which he figures at plate 67, figures 31 and 32, seems unjustifiable in view of this additional material. The two features on which he lays stress are, the sharp definition of the inner edge of the apical marking, and the reduction of the discoidal spot; in the Schahrud specimens the former is very broad and diffuse, the latter large and almost quadrate in the both sexes. This race from N. E. Persia may well be called *verityi,* ssp. nov. the types being the ♂ and ♀ in the B. M. figured by Verity (1. c.) ; and *persica,* Verity restricted to the race from W. Persia, Kurdistan, &c."

The egg when fresh is pearl white, but soon changes to orange and later to grey just before hatching. Eggs from the abdomen of female, and others laid on food-plant are in shape a long oval, with flattened base when attached to the plant. The egg resembles that of *E. belemia,* but its longitudinal ridges, about 20 in number, appear under the micrcscope rather stouter and more prominent than in *belemia.* There are delicate fine transverse ridges which in certain lights are seen to pass over the longitudinal ones. The egg is laid either on a sepal or on a hair of asepal of a young unopened flower-bud. Females of *E. ausonia* were observed ovipositing on the following crucifers which have been identified at Kew :—

1. *Brassica tournefortii,* Gouan.
   About three feet high having small pale yellow flowers at the ends of long thin succulent stems, the leaves being mostly at the base of the

plant. On this plant the eggs were laid singly upon the sepals of a young unopened flower-bud, or upon the thin succulent stem of a flower-bud.

2. *Sinapis arvensis*, L., a race (charlock).
   About six inches high, when growing on ridges of gypsum rock, with bright yellow flowers, short stem and very hairy leaves; an egg being laid on the tip of an unopened flower-bud, another on a hair on a sepal of a young flower-bud.

On April 9th (1920) several orange coloured, eggs, probably of *ausonia*, were found on several plants of the first mentioned species, placed singly, most being on the sepals of unopened flower-buds, but two on the stem of flower-heads.

On April 11th some of the eggs darkened, and on the 12th the empty uneaten shells of three were found still on the buds, the minute golden yellow hairy larvæ being near them on flower-buds. On 15th April these larvæ were still yellow and markedly hairy with a dark particle at the tip of each hair.

Just after hatching the larvæ fed on the flower-bud. On 19th April one larva on the food plant cast its skin, and after this measured five-eighths of an inch long. Head large, pale green minutely dotted with black, all legs green. A white lateral line with spiracles in it, and with bluish mauve upper edge; above this yellowish green and dorsally mauve.

22nd April, the five larvæ on the plant are alike; length 1⅜ inches, deep green with a conspicuous white lateral or spiracular line with rather narrower purple upper margin, above this deep green, then dorsally purple; legs green; head purple, rather paler in front. Four of these larvæ pupated, three head upwards and one head downwards. They all became pale brown with dark brown long beak like process, a lateral white streak on each side and dark dorsal streaks. They all became stiff and hard and failed to reach the imago stage. Possibly small black ants, which destroyed other larvæ and were a great nuisance there, may have bitten these larvæ shortly before they pupated.

Both these larvæ and pupæ resembled those of *E. belemia* reared the previous year. The only apparent difference from those of *belemia* being a rather broader and more conspicuous white lateral line.

It is curious that although females were seen ovipositing and these larvæ and pupæ were reared from the eggs, no examples of *ausonia* were seen about to correspond with this brood. No opportunity occurred of ascertaining whether any were about on the Jebel Hamrin of this, which should have been the dry season brood, the first brood having been taken in company with the Wet season brood of *E. belemia*, of which also as previously noted the dry season brood was noticeably absent at Baiji (in 1920).

E. ausonia was in March 1920 more common than *E. belemia* on the Jebel Hamrin at Fathah gorge. On the other hand at Kizil Robat the previous year when both broods of *E. belemia* were very common no *ausonia* were seen at all. *ausonia* is very active, though its flight seems more fluttering and less direct than that of *belemia*. *ausonia* averaged slightly larger than the same brood of *belemia*. The two forms are found together and may easily be mistaken the one for the other, and both vary much with the seasons; but the distinct bands of green and white beneath distinguish *belemia*. *ausonia*, like *belemia* was attracted by the smell of sulphuretted hydrogen from some oil-drums.

Localities.—Mesopotamia—fairly common on the Jebel Hamrin and on the right bank of the Tigris at Fathah.

E. belemia, Esp. Seitz. Vol. 1.22a.

KEY: Colour white and black above; alternating green and white bands across hindwing beneath.

Of 98 specimens examined (23 ♂, 16 ♀, Spring form; 18 ♂, 19 ♀, Summer form; and 4 ♂. 1 ♀ ? Third brood), Capt. Riley remarks :—

"Specimens of the first generation (f. *belemia*,) and those of the 2nd generation (*palestinensis*) are very distinct although, as can be seen from the dates above, they overlap by about a fortnight, both forms being taken in perfectly fresh condition in the last week of March at Kizil Robat. The five specimens referred to above as a possible 3rd generation are interesting in that by their smallness and the depth of the green of the hindwing underside they recall somewhat the 1st generation. They are readily separated from the normal second generation specimens; it seems reasonable to suppose they represent a partial third generation.

Individual variation in the black markings of the forewing is considerable. 1 ♂ (Kizil Robat, 30th March 1919) has the black patch on the discocellular expanded to form a large cloudy area which fuses with the apical patch throughout the whole of its outer edge. The depth of the colour of the apical patch is very variable in the summer forms, in some light french grey, in others as black as in the 1st brood. 1 ♀ (Kizil Robat, 2nd April 1919) resembles the ♂ mentioned above, except that above, the extension of the patch is confined to the veins, but below, the whole of the disc is covered with scattered black scales."

There are two broods, very distinct one from the other.

1. *Wet season form* (=*belemia Esp.*).—*Upperside*—*Forewing*: Ground colour white, base black; a broad densely black oblong discoidal spot extending to, but exclusive of the costa, which is pink near the base. Apex black containing from 2 to 4 white spots decreasing in size from costa.

Hindwing.—Base black, remainder white.

Underside.—*Forewing* ground colour white; costa pink speckled with green. A broad sinuous black discoidal spot with central white lunule, its convexity inwards. At apex four green bands, the innermost being a mere spot, the outermost extending nearly to the tornal angle, with wedge-shaped white bands between them.

Hindwing.—Ground colour white with seven broad dark green bands crossing the wing vertically; a minute loop connecting band 3 to 2, a thick one band 4 to 3, so that band 4 appears to bifurcate; sometimes a small loop connects band 5 with 4, or 5 may join 6, but often extends only to the middle of the wing. These green bands have sharply defined margins and are broader than the glistening pearly white bands between them.

2 *Dry season form* (=*palestinensis*, Rober).—Slightly larger on the average.

Upperside:—*Forewing*: The base of the wing is white; discoidal spot narrower and less densely black, and black markings at apex less dense.

Hindwing—White.

Upperside.—Costa pink striated with black. The green bands much less pronounced, narrower than the white bands, and much broken, forming a meshwork, their margins being very irregular. The white predominates over the green, the white being tinged with yellow on the forewing at the posterior end of the bands and in the hindwing across the middle of the wing from the base and near the green.

In both forms—Antennæ black above, pinkish white beneath and tipped with pink. Head black above, white below; hairs behind eyes orange-pink. Thorax and abdomen black above, white beneath. Proboscis and legs pink. Cilia black opposite veins, white between on forewing; white on hindwing.

Expanse.—1·6 in. to 2·25 inches.

A few examples were taken having very faint markings beneath. Three examples of aberration in which the dark markings on the forewing are in excess were taken. One of these, taken on March 30th, has the black of the apex

extended inwards to the innerside of the discoidal spot, which merely appears as a white semi-circle.

An egg, glistening pearl-white, seen laid on March 24th by a ♀, which was then netted, on the tip of a small bud in the centre of a group of buds in a young flower-head of a yellow crucifer like mustard.

On the 27th March this egg had become orange-coloured, and on 28th it hatched, the larva being pale green dotted with black, head black. It was seen feeding among the florets of the flower-clusters. This larva was subsequently lost. On March 24th a small grey larva with black head was found on a head of flower-buds of this yellow crucifer, where the young leaves near the buds had been eaten. On April 6th a female was netted after laying a glistening white egg on a young unopened bud of a mauve-flowered crucifer, the next day this egg had changed to dull yellow.

On 30th March (1920), on the Jebel Hamrin, at Fathah gorge, females of *E. belemia* were seen ovipositing on *Hirschfeldia adpressa*, Moench, a charlock-like yellow crucifer; and on white mustard, *Sinapis alba*, L., a race, the egg being laid upon the young unopened flower-buds.

These plants were identified at Kew. The egg has about twenty longitudinal ridges with fine transverse ridges between and crossing these.

On March 28th (1919) three full-grown larvæ were found on seed stems of a yellow crucifer. One pupated the same evening head upwards on the thicker portion of the stem just below the seeds, the body-girdle being very slender, and the imago emerged on 6th April. The second pupated head downwards during the night on the same stem about four inches below the first pupa. This pupa dried up and died. The third larva escaped. Another larva found on March 23rd pupated head downwards on 27th and a butterfly emerged on April 5th.

A full grown larva measured $1\frac{3}{8}$ inch in length, tapered gradually toward either end, was dark green with lateral line bright purple above, white below. The dorsal line was dull purple, and the whole body minutely dotted with black. Head purple. The larva on changing on March 29th to the pupal state took, from the protrusion of the "beak", which emerged bent forwards, to the final shaking off of the larval skin, about one minute only. The pupa was green with long pointed mauve-coloured beak and at first had lateral purple and white lines, but these soon changed to pale green, uniform with the rest of the abdomen. From this pupa emerged at 7·37 a.m. on 6th April a female butterfly, the black and white markings of the upperside having been clearly visible in the pupa the previous day.

This butterfly was common on the banks of old canals and on the crests of stony hills at 600 feet and between them and the rivers Dyala and Tigris, flying hurriedly up and down the canal banks or about flower-covered slopes near the rivers, occasionally settling at flowers for a short time only. It is very active, though the female settles the more often. It is inquisitive, having passed the net it returns and hovers to and fro and so gives a chance of capture without a chase, which in the case of this active little butterfly is a consideration on steep stony ground. Large examples such as females may, when on the wing, be mistaken for *Pontia daplidice* though they are usually less inclined to settle than is that species. Both sexes were attracted by the smell of sulphuretted hydrogen from some oil drums, and, it seems by the scent of honey from some moths captured several years before, still retained by the net.

Localities:—Mesopotamia—Kizil Robat, and Jebel Hamrin and Jebel Kizil Robat near the Dyala. Wet. S. form end of January to end of March 1919 Dry. S. form end of March to mid April 1919, both broods common. Right bank of the Tigris—at and near Fathah, Jebel Hamrin. Wet. S. form latter half of March 1920. Common in Mediterranean region.

Synchlœ falloui, Allard, from Algeria to Somaliland and Arabia, is the only near relation to *S. belemia*, and so is mentioned here.

E. charlonia, transcaspica, Stgr. Seitz. 1.22c.

Male wings more rounded than *lucilla* ♂ and much paler yellow, about same tint as *lucilla* ♀ and, like it with forewing paler than h.w. Upperside, colour pale sulphur-yellow, base of wings black. Forewing: discocellular broad, short, transverse oblique irregular oblong black bar as in typical *charlonia*, not so large and rectangular as in *lucilla*, and not quite extending to the costal margin: Apex black with pale spots. Hindwing, uniform immaculate: underside forewing yellowish white, pale yellow in cell; the discoidal spot black and oblong: costal and terminal margins pink. Hindwing and apex forewing green of the same tint as *lucilla*, but the white central spot of hindwing smaller and with very small white spots on costal margin intermediate between the veins. Antennæ cream-white, tips yellow.

Expanse.—1·5 inches.

Capt. Riley notes of this:—"Of the typical *transcaspica* (2nd generation) form. The first brood (? January-February) form has been named *vernalis* by Verity. LeCerf records it from Danoh Konh, and says it is slightly intermediate; the specimen referred to above agrees very well indeed with transcaspian specimens in the B. M."

This male in fresh condition was taken by the writer on 11th April 1920 on a small hill-crest about 500 feet elevation on the Jebel Hamrin ridge at the Fathah gorge on the right bank of the Tigris. Its habits seem to be identical with those of *A. lucilla*, which is very active, keeps much on the move and has a hurried flight, keeping usually a foot or so above the ground on which it occasionally settles with open wings.

Locality:—Mesopotamia—Jebel Hamrin range on the right bank of the Tigris at Fathah gorge, on April 11th.

E. gruneri, H.-S., ssp. **armeniaca**, Chr.Seitz. Vol. 1. 22 g.

Captain P. A. Buxton obtained it commonly at Menjil towards the end of March 1919, flying amongst thick bushes in a gully. *E. gruneri* H. S., which is yellow, is found in Turkey and Greece. *armeniaca* is a white race flying in Armenia, South Asia Minor, North Syria and North Mesopotamia.

GENUS GONEPTERYX, Leach.

G. farinosa, Zeller. Seitz. Vol. 1.42.b:

KEY: Very similar to the English "Brimstone," only with mealy appearance on the upperside, and the orange discoidal spots of forewing are minute or absent.

Two males were taken in the Karind Valley, N. W. Persia, at 5,300 to 6,000 elevation in mid-July, one of them in a vineyard, the other in a glade in a wood.

They are slightly larger and have smaller orange spots than either *rhamni* type or *r. nepalensis*; the hindwing being paler than the forewing, and the butterfly when flying looked at first sight very like a *Catopsilia*.

Localities.—Greece, Asia Minor, W. Asia.

There are two named sub-species:—

centralasiæ, Stgr., from Turkestan, and *chitralensis*, M., from Chitral.

Food-plants—*Zizyphus jujuba* and *Z. vulgaris*.

GENUS ZEGRIS, Ramb.

Z. eupheme, Esper. Seitz Vol. 1. 23 a.

Apex of forewing grey with orange centre. Underside of hindwing white with an irregular branching green patch partly tinted with yellow or sienna.

This " orange tip " occurs in S. Spain and S. Russia, also through Asia Minor to Armenia, Caucasus, Syria and Persia. Its races intergrade, and the differences between them are slight. The typical form is from S. Russia and has normally a good deal of yellow on the *ground-colour* of the hindwing beneath, this containing only about 6 small round spots of white.

The butterfly has a remarkable discontinuity in its European distribution, there being no occurrence of the species between Spain and S. Russia. Its transformations are described by Hofmann and others.

Subsp. *meridionalis* Lederer, Seitz. Vol. 1 23b, from Spain has underside hindwing ground colour often quite yellow so that there are no white spots: specimens hardly distinguishable from type also occur.

Subsp. *menestho*, Menetries, from Asia Minor and W. Kurdistan is described as having f.w. with apex less black, powdered with light scales, underside of hindwing a clearer yellow with less green.

But the nearest named form to that here mentioned from the Dyala is *tschudica*, Herrich-Schaffer, Seitz. Vol. 1. 23 a, described as an aberration of the typical form from S. Russia, but occurring also in Syria and Caucasus, and having no yellow on hindwing beneath, but only green on white. Many examples, however, from Mesopotamia are " drier " still than this, having more white in proportion to green, also the green is more tinted with yellow or sienna especially in the later emerged examples. The National collection, it may be noted, has very few of these eastern or " dry " forms of *eupheme.*

The *egg*, taken from the abdomen of a *Z. eupheme tigris*, seen under the microscope, is a broad stumpy sugar-loaf cone with slightly rounded base. One seen 'end on' showed fifteen longitudinal ridges, and also fine transverse ridges between them, each distant from the next by about a third of its length. Breadth to length of egg is as 3 to 4, it being much broader comparatively than the egg of either *E. belemia* or *E. ausonia.*

Larva.—The larva is shaped like that of *Euchlœ*, but is hairy and, it is said, spins itself a cocoon of stout silk attached at both extremities by threads, in this cocoon-making habit resembling the Papilionid genera *Thais* and *Parnassius.* Seitz says: " Larva thick, cylindrical, densely hairy. Pupa stout, with a dense cocoon, in which one finds still a remnant of the thread characteristic for pupæ of Pierids ". The genus is based chiefly on the larva. Two other species occur, *Z. fausti*, Chr., from C. Asia, with a brick-red " tip "; and *Z. olympia* Edw., from Texas.

Kane says: Food plant. *Sinapis incana* and a species of *Raphanus*, etc.

Subsp. *dyala.* Peile. See Plate. Fig. 1·2. ♂ ♀.

Description:—Upperside.—Forewing. Ground-colour white. Costa sinuous in outline. Discoidal spot black, convex on basal side, concave exteriorly. Apex inner third black turning outwards at an angle to join costa, middle third an elongated bright orange patch which varies slightly in size and forms an angle with a white subcostal bar, outer third grey. The orange patch usually less, and grey apex darker than in *menestho* and not tinged with yellow. Hindwing white, with markings of underside showing through slightly. *Underside* f.w. ground colour white. Discoidal spot dense black as above. Apex with a few touches of yellowish green. Hindwing, an irregular green patch, the shape of which, on the right side, may roughly be compared with that of the map of England and Scotland, with two broken up prolongations of the colour of raw sienna and green towards the costa. These prolongations vary much in

breadth and in the amount of yellow about them, but are less than in Seitz fig. of *tschudica.*

♀ slightly the larger as a rule; the orange patch at apex of f.w. usually smaller, sometimes yellowish, and rarely absent (*ab. luctifera,* Verity).

Head much tufted with hairs. Palpi short. Antennæ short with thick club. Legs thick and short. LeCerf has figured this form, but as *tschudica* to which it does not belong.

Locality.—Common in Mesopotamia from 350 to 600 ft. elevation, in March and April about low hills and plateaux near the river Dyala, especially about two common species of crucifer, one having yellow and the other mauve flowers. The males are active, scurrying about and also settle at flowers.

The butterfly varies but little. The orange patch on the forewing is a little larger in some males than in others, and, as before mentioned, in the female may rarely be absent.

Expanse.—44-49 mm. Br. Mus. Types, No. Rh. 163 ♂, 164 ♀; ♂ 29, ♀ 22, from Kizil Robat taken between 25th February and 6th April 1919.

Habits.—It is a fast flier, but is easily taken at crucifers which it frequents. Flight rather like that of *P. daplidice,* settles more about 10 a.m. than later, when it is much on the wing, flying fast and making the chase rather difficult over the rough stony ground where the loose stones are hidden by the grass and flowers. On March 24th a female was seen to lay a glistening pearl white egg, very similar in appearance to that of *E. belemia,* on a young head of flower-buds of the common yellow crucifer. This had changed to orange on the 27th and to blackish grey on the 30th. On March 24th another was seen to lay a similar egg on the tip of a central small unopened flower-bud of wild mustard. A pale green cylindrical larva, of normal Pierid shape, finely dotted with black and covered with short hairs, was found on a seed stem of this yellow crucifer about the end of March and was perhaps a full grown larva of this species, but being hairy was thought at the time to be the larva of some moth and so was not kept.

On April 9th a worn female *eupheme* was seen to settle at some half dozen young flower-clusters of this yellow crucifer and on one of a mauve-flowered crucifer, and was seen to apply the tip of the abdomen to the flower-buds. The butterfly was netted and these flower-clusters taken back to camp and there examined with a lens, but no egg could be seen on them although the abdomen of the butterfly was found to contain 9 eggs. Length to breadth of egg is as 4 to 3.

This species was first observed on February 23rd and was commonest in the second week of March. On June 25th dry seed-stems of crucifers where the butterfly had previously been common, were carefully searched, but no cocoons could be found, so they are probably at the roots. In April 1920, a larva, purple with yellow dotted line, was found on a yellow crucifer on a hill-crest at Fathah which turned to be a 'beaked' pupa which suspended itself with body-girdle like other *Euchloe* pupa, and was very probably of this form. It died as a pupa.

Z. eupheme dyala, Peile. (Etom. 54, p. 151, 1921). Ann. Mag. Nat. Hist., Vol. 8, p 591. See also Plate. Fig. 1 2.

Of 26 ♂, 26 ♀ (now incorporated in B. M. collection), and 6 more Capt. Riley notes:—

"In some five females the apical patch is entirely deficient of orange (=ab. *luctifuca,* Verity) and in a number of others it is very much restricted or nearly obsolete; the males too show a considerable amount of variation in the extent of the orange.

Resembles *tschudica* in the whiteness of the apical area of underside of forewing, but can at once be separated from it by the far greater reduction in the extent of the green mottling of the underside of the hindwing.

There are three pairs of typical *tschudica* in the B. M. from S. Russia, all of which agree far better with Herrich-Schaeffer's figures than do these specimens from the R. Dyala.

I suspect that the ♂ mentioned by LeCerf taken at Danah Kouh April 1908, is referable rather to this race than to true *tschudica*."

Z. eupheme tigris, Riley. Ann. Mag. Nat. Hist., Vol. 8, p. 591.

13 ♂, 4 ♀ (now in B. M.) taken at Fathah on the right bank of the Tigris from 3rd March to 5th April 1920, Capt. Riley remarks :—

"This race, like the preceding, comes very close to *tschudica*, H.-S. It can, however, be separated at once from that by the yellowness of the apical area of the underside of the forewing, this area being white in Herrich-Schaeffer's figures (Schmett. Eur. f. 449-453) with the exception of the extremes of the inner edge, uniformly yellow in *tigris*. The mottling of the underside of the hindwing also has considerably more yellow in its composition than is the case in true *tschudica*. Two males approach *menestho* in the richness of the underside coloration; one approaches *dyala* in the poverty of it. The extent of the orange in the apical patch on forewing above is on the average, appreciably greater than is the case in *dyala*.

B. M. Types No. Rh. 165 ♂, 166 ♀.

At Amara on 20th May 1918, the writer saw an 'orange-tip' with yellow tinged ground-colour on hindwing which was probably a very late example of this f. *tigris*. It was going from flower to flower in a garden, and was then mistaken for *Ixias pyrene*."

GENUS COLIAS, Fabr.

C. croceus, Fourcroy (=**edusa,** Fab.) Seitz., 1.26g.

Of 60 ♂, 90 ♀ now incorporated in the National Collection, and 17 more from Amara, Fathah Jebel Hamrin (River Dyala), Kizil Robat in Mesopotamia; and Paitak and the Karind Valley in Persia.

Capt. N. D. Riley remarks as follows :—

"A magnificent series. The Persian specimens cover the dates 14th July-10th September; the Mesopotamian series represent captures in nearly every week of the months January-July (middle). As regards size they range from an expanse of 3·7 mm. (♀ Jebel Hamrin. 3rd July 1918) to 5·4 mm. (♀, Amara, 26th May 1918.) The January and February specimens are noticeably and consistently smaller than those of any other month with the exception of the one very small female mentioned above, and an exactly similar one from same locality, dated 10th June 1918.

The amount of variation in colour and markings is remarkable. 1 ♂ (Kizil Robat, 22nd March 1919) has ground almost lemon-yellow instead of orange; some examples in which all the veins are marked with yellow across the outer marginal border, are referable to ab. *faillæ*. Stefanelli; of the females almost exactly 33⅓ per cent. are of the white *helice* form: 2 of the ♀ f. *anbuisonni*, Caradja, intermediates in which the yellow has failed; 1 of the ♀ f. *helicina*, Oberth, an intermediate form in which the red pigment is absent, leaving the specimen a delicate lemon-yellow.

For the rest no two specimens are alike, so it would serve no useful purpose to go into details."

There appear to be several broods of the "clouded yellow" in the year in Mesopotamia. It is very common, especially about the end of March, and is widespread from the banks of the Tigris to the highlands of Persia. Near the Dyala it frequents slopes where its food-plant, a small yellow-flowered trefoil

grows on the fringes of the plateaux, and in vegetable gardens and about patches of lucerne.

Among some large bright orange examples of the summer form taken in Mesopotamia in July are a few having a white centre more or less distinct to the black discoidal spot on the underside of the forewing, but no other resemblance to *C. fieldi*. At Harir, at 5,300 ft. in W. Persia in July, some specimens were taken having this discoidal spot black, the discoidal cell yellow anteriorly and orange posteriorly, the remainder of the underside being markedly green.

As in other parts of its range, the green appears to be most marked in the earliest or " wet " brood and in those found in the highlands ; the underside in June and July in Mesopotamia, or by the Dyala at Kizil Robat, being more " dry ", *i.e.*, more yellow than green. As elsewhere the females vary in shade.

White (*pallida*, Tutt), but not cream-coloured (*helice*, Hb.) forms were common ; one taken at Mirjana on Jan. 28th, 1920, was of the faintly yellow-tinted form *citrina*; another more like *helice*, Hb., was taken on June 13th. 1920, at Baiji. White females with much grey above were common at Lucerne. One dull cream coloured *helice* form was taken with a slight edging of orange along the posterior margin of the forewings. When in the paper envelope this one laid eggs of the usual spindle shape and yellowish pearl colour. At Amara in May 1918 and at Baiji in June 1920 very fine grey white females with pale discoidal spots on the hind wings and much grey above were taken. On 21st April 1919, at Kizil Robat, a white female was taken in copula with *croceus* male, and similarly another on 3rd June (1920) at Baiji, the male doing the flying. On stony-slopes near the Dyala at Kizil Robat about 8 o'clock in the morning in early April one could be fairly sure of putting up some white females of *croceus*. Early in June at Baiji both yellow and white forms of the female were seen laying eggs singly on the upper side of leaves of lucerne about the middle of one half of the leaf, the butterfly settling but a short time to deposit each egg and then going on to other leaves near-by. White clover was more plentiful than the purple flowered lucerne, but the eggs were laid on lucerne.

The *egg* of yellowish pearl colour when just laid, changing later to salmon-pink, appears slightly smaller and narrower than the egg of *E. belemia*, although of the two butterflies *croceus* is much the larger. It is spindle shaped, the top being pointed like the fuze-cap of a shell. 19 longitudinal ridges were counted : a few of these coalesce and some do not quite reach the top of the egg. There are fine transverse ridges. Figures of the various stages can be seen in South's and Kirby's works.

Larvæ.—At Baiji in May and June two rugose dark green cylindrical larvæ were found on lucerne, having white lateral stripe, and on each segment a minute black spot just below the stripe and a touch of red on the white stripe just above the black spot. These fed on lucerne until they pupated ; one on 25th May suspended horizontally from the petiole of a lucerne leaf, the tail end being towards the stem of the plant ; the other pupated on 21st June upright against the main stem of lucerne.

Pupa.—Stout and thick, the wing-cases being very prominent so that it appears pigeon breasted and with a dorsal hump. In the horizontal one the body girdle was remarkably long so that the pupa swung freely. Colour in one at first semi-transparent green of the same shade as the leaves ; in the other pea-green, this again much resembling the leaves. One of these pupæ, as the leaves become more yellow, also changed maintaining the resemblance. On the fifth day the orange of the forewing showed through the pupa-skin as also a dark central mark on each wing and at the end of each vein a minute black spot. On either side of the ventral surface of the first three visible abdominal segments was a brownish black-streak. On the sixth day the markings of the forewings showed so distinctly that the sex of the enclosed butterfly could be determined. The cilia and antennæ were marked out in rose-pink. From the pupa of

25th May a male *croceus* emerged about 10 a.m. on 1st June; and from that of 21st June a yellow female *croceus* emerged about 5 a.m. on 27th June (1920). At Kizil Robat, from an egg seen laid on a small yellow flowered trefoil, a larva was reared upon the same plant and a male *C. croceus* resulted.

Localities.—The butterfly is very common in Mesopotamia, especially about patches of lucerne, in vegetable gardens and on slopes where the small yellow flowered trefoil grows on the fringes of the plateaux. It is very common in March, early April and June.

Mesopotamia.—Sheikh Saad; Wadi river near Kut; Amara, Baghdad Kizil Robat, Baiji, Mosul.

S. Kurdistan.—Jujar (end of November).

N. Persia.—Karind Valley; and abundant throughout Europe.

GENUS COLOTIS, Hb. (TERACOLUS, Swains.)

C. fausta, Oliv. Seitz. 1.23c.

Of 31 ♂, 41 ♀ (13 ♂, 19 ♀ of these now in the B. M.) examined, Capt. Riley notes:—

"The series shews very considerable variation in size, depth of colouration and markings, but, according to the dates on the specimens, this does not seem in any way to coincide with any month or months in the year. The extreme forms in the direction both of 'wetness' and 'dryness' were all taken at Jebel Hamrin (R. Dyala,) within a few days at the beginning of July. These include a large and very heavily marked (wet) pair; a smaller male in which the marginal markings of the forewing above are reduced to a darkening of the extremities of the veins only; females ranging in colouration from that of the male to a pale yellowish pink and 1 ♂ which, but for a faint pink tinge on the hindwings, is pure white due to failure of pigment presumably, as the shape and structure of the scales appear to be perfectly normal."

Buxton took this at Amara from 11th September to 4th December and at Shahroban and Baqubah, 29-31st July; Qasr-i-Shirin, 24th November 1918. "Rests at night among the yellow-green twigs of *Sueda.*"

Abundant in Mesopotamia and North Persia, from the middle of June to the end of November. There are two well-marked broods, that of the dry season up to mid-October, when the second brood, larger and with darkly marked underside appears and is very common, especially at flowering mint by water. In September and October 1918 the butterfly was seen migrating in considerable numbers. A gynandromorph with left side male, right side female, is in the National Collection; it was taken at Amara by Major R. Brewitt Taylor, August 3rd, 1916.

On July 6th eggs were seen to be laid singly upon the upperside of the leaves of a round-leaved thorny caper (*Capparis spinosa*, L.) which has a very beautiful rather large white flower, with long white stamens which turn mauve, and curious green fruit about the size of a small lemon, the skin of which splits irregularly into three portions each of which curls backwards towards the stem exposing a crimson jam-like substance attached to it and in which the seeds lie embedded.

This food-plant not being in leaf earlier than June no wet season brood was seen in Spring, when "wet" forms of other species are about, although a well-marked wet-season form appears in large numbers in October as already stated.

Period. June 15th to December 31st.

Localities.—Mesopotamia.—Basra, Oct. and Nov. Kut, common, "not seen until June;" Baghdad; Banks of Dyala at Jebel Hamrin and Kizil Robat; Khanikin, *N. Persia*—Seripul, common; Harir, 5,300 ft. very common in Sept. Kermanshah, Sept. to 10th October scarce.

LYCÆNIDÆ.

Key to the forms of *Lycæninæ* of *Mesopotamia*.

A. Hindwing: Without tail.
- *a.* Upperside, brown without blue; a complete subterminal series of black spots and orange lunules. Underside forewing a basal blackspot .. .. ..*Lycæna astrarche.*
- *b.* Upperside, ♂ blue. ♀ brown.
  - *a*¹. ♀ with more or less blue; an incomplete subterminal series of black spots and orange lunules. Underside forewing no basal spots .. .. ..*L. icarus.*
  - *b*¹. ♂ sky-blue. Black spots on underside conspicuous ..*L. bellargus.*
  - *c*¹. ♂ satiny blue; ♀ brown, veins darker; Underside cream, spots minute ..*L. dama karinda.*
  - *d*¹. Smaller, Exp. 30 mm. ♀ dark brown. Underside spots larger.*L. damone damalis.*
- *c.* Upperside, brown, underside hindwing, a row of 3 subtornal jewelled black, orange circled spots .. ..*Chilades trochilus.*
- *d.* ♂ violet blue and brown above. ♀ brown.
  - *a*¹ Underside. Hindwing, two subcostal and another basal prominent black spots ..*Chilades galba.*
  - *b*¹ Underside f.w. with many jet black spots: no jewelled spots, a black spot in middle of cell of forewing .. ..*Zizera karsandra.*
  - *c*¹ Underside, black spots minute. No jewelled spots, no spot in middle of cell of forewing ..*Zizera otis.*
- *e.* ♂ yellowish tawny; ♀ pale brown .. ..*L. peilei.*

B. Hindwing: with a short filamentous tail.
- *a* Forewing: veins 11 and 12 anastomosed. Underside white spotted with black or brown: a subterminal series of spots, some with shining metallic scales ..*Tarucus theophrastus.*
- *b* Forewing, veins 11 and 12 not anastomosed, but an oblique short bar between them near base. Underside banded with pale grey or brown .. ..*Lampides boeticus.*

C. Upperside more or less copper-red
- *a* with dark outer border and spots.*Heodes phlæas.*
- *b* more yellow-gold in colour; filamentous tail to n. w. ..*H. thersamon kurdistanica.*

GENUS LYCÆNA, Fabr.

L. astrarche, Berg. "The brown Argus". Seitz. 1.79k.

Upperside—Fore and hindwings brown without any blue colouring; a black discoidal spot; a well marked subterminal series of black spots bordered outwardly by orange-red lunules complete to apex.

Localities.—Kizil Robat, a few taken in April and May. Kirkuk, a ♀ on 16th October 1919. Very common in the Karind valley at 5,500 ft. in July and August.

Of 36 ♂, 24 ♀ examined (19 ♂, 18 ♀ of these now in B. M.). Capt. Riley notes:—

"Exceedingly variable both in size and markings. The short series from Kizil-Robat (spring forms) are presumably referable to f. *sarmatis*, Gr. Gr., on account of the white undersides and the width of the orange bands below; the N. W. Persian series (July-September) agree with them in respect of the latter feature, but have the characteristic yellowish brown undersides of the summer forms and would best be called f. *æstiva*, Staud."

L. icarus, Rott. *var* **persica,** Bienert. Seitz. 1.80g.

"The Common Blue." Male, upperside purplish blue with rich satiny lustre and anticiliary slender black lines. Female, upperside very dark brown with more or less blue irroration, and a subterminal series of conspicuous orange-red spots, the spots becoming obsolete towards the apex of forewing. Underside male pale grey, female brownish grey, with a number of white encircled black-spots and on hindwing a postdiscal series of black lunules outwardly bordered with reddish brown. A basal black spot on forewing.

Localities.—Mesopotamia: fairly common. Kizil Robat, N. W. Persia: "Seripul where it was flying in numbers on 3rd September 1918. By far the commonest Lycænid at Kermanshah" (Broughton).

Kizil Robat, Mesopotamia, 14 ♂, 5 ♀, May-June, July 1919.

Some of these ♀s have much white on hindwing above just within the orange lunules.

N. W. Persia: Kermanshah. 4 ♂, 3 ♀, late August 1918; Harir, 21 ♂, 3 ♀; Karind Gorge, 8 ♂, 6 ♀, July, August, September 1918.

Small form, dwarf only, 8 ♂, 3 ♀, July, August 1918, Harir.

29 ♂, 17 ♀, of these are now in the National collection. Buxton took 3 "very ordinary looking" at Menzil, 7th April 1919; and Qazvin, August and September 1919, "extremely brown below."

L. bellargus, Rott. Seitz, Vol. 1., 81b.

1 ♂, 9th August 1918; 2 ♂, 1 ♀, 16th August 1918, now added to B. M. collection.

Only one specimen from Persia (1 ♂) in B. M. previously.

L. (Polyommatus) dama sub-sp. **karinda,** Riley. & N. H. Vol. 8, p. 597. See Plate Fig. 8·9.

16 ♂, 12 ♀, of which seven pairs are now in the National collection, taken at Harir (5,300) and Karind Gorge (6,000) from 14th July to 9th September 1918. On 12th August males were common.

Note by Capt. Riley:—"Differs from typical *dama* in that the discal series of spots on underside of hindwing is always complete though the spots composing it are minute. The marginal and submarginal markings also more fully developed. In the female the veins on upperside are conspicuously darker."

B. M. Types No. Rh. 75 ♂; 76 ♀, 16th July 1918. Karind Gorge.

LeCerf (Ann. d'Histoire Nat. II, Pt. II, p. 69, 1913) records '1 ♂ *L. dama* rom Deh Tchechma, Arabistan, Persia, 31, VII, 1898,' otherwise it would

appear only to be known from Staudinger's original locality, Malatia, Mesopotamia. LeCerf's specimen, however, is probably referable to *karinda*.

This form was taken in company with the two next mentioned and other species of Lycæna at flowers in glades and waste ground by a stream.

L. (Polyommatus) peilei, Bethune-Baker Plate, Fig. 15·16.

Described by G. T. Bethune-Baker, in the Entomolgist's Record Vol. XXXIII, pp. 63-64, 1921.

" An extraordinary and beautiful new Lycænid belonging to the *dama* section of the genus *Polyommatus*.

♂ Both wings yellowish tawny colour (the exact colour is very difficult to describe, at first sight it looks almost orange), the prevailing tone is deep yellowish. Primaries with an abundant supply of greyish androconial hairs and small scales, which give the wing an unusual aspect. The secondaries are almost free of these scales except in the basal area. Fringes grey, the basal half being darker than the terminal portion.

Underside.—Both wings cream colour with a slight pinkish tinge, with blackish spots palely encircled. Primaries with a dark crescent closing the cell, a postmedian line of six spots, the lowest one being double, those in the radial area are excurved, the fourth and fifth spots recede sharply basewards, the sixth (double spot) is shifted outwards.

Secondaries, with all the spots very small and inclined to obsolescence, but the two subcostal ones, *viz.*, that near the base and that half-way along the costa, always present and definite though small, the spots in the postmedian row are reduced to mere points and are often absent, there is a trace of a submarginal row of dashes of the ground-colour edged with a tone of cream colour paler than the ground.

♀ Pale brown colour, otherwise like the male on the underside.

Expanse.—♂ 38-42, ♀ 38 mm.

Habitat.—Karind Gorge (N. W. Persia), 6,000 ft. July (H. D. Peile).

Types in the British Museum, six ♂♂ and one ♀. (B. M. Types, No. Rh. 179 ♂ ; 180 ♀, 17th July 1918, Karind Gorge, & co-types.)

" The Karind Gorge is just over the Persian frontier.

It is I think the most extraordinary Palearctic species of the true *Lycæninæ* that I know, its colour separates it from everything, but the underside pattern shows it to be a near ally of that beautiful species that Staudinger called *dama*, with which indeed it was flying when Lt.-Col. Peile captured it. The androconial scales also connect it closely with the *dolus* group."

Taken at flowers in glades, 14th to 17th July 1918. None seen 12th August.

The male is easily recognized on the wing : but the underside in both sexes makes them readily mistaken, when settled, for the races of *dama* and *damone* with which they are found.

L. (Polyommatus) damone, subsp. **damalis,** Riley. A. & M. N. H. Vol. 8, p. 597. See Plate, Figs. 13-14.

35 ♂, 17 ♀ of which a series of 12 pairs are now in the National collection.

Taken at same localities—Harir and Karind Gorge—as *dama* from 13th July to 12th August 1918, and distinguished from that in the field chiefly by being smaller and having generally more conspicuous spots on the underside ; the females being more uniformly brown above. As with *dama* the females average slightly smaller than the males. More robust and the males more decidedly blue than *damonides*, Stgr. Capt. Riley notes as follows :—

" Nearest the var. *xerxes*, Staud, in colour, and in that the hindwing underside is entirely devoid of any trace of the longitudinal white stripe ;

but differs constantly in its much larger size, 30mm. and more, whereas *xerxes* is 23-24 mm.; and in being entirely devoid of any trace of basal green scaling on the underside of both wings. The upperside colouration of the ♂ is perhaps a shade paler and brighter than in typical *xerxes*, and the hind-marginal orange lunules in the female more pronounced. The general colouration of the underside in the male lighter, more greyish, less brown than in *xerxes*; in the female of a more yellowish brown. The discoidal spot on the forewings is anteriorly more acute than in any *xerxes* examined."

B. M. Types Nos. Rh. 177 ♂, 13th July 1918; 178 ♀, 16th July 1918, Karind Gorge.

This form was about twice as numerous as *dama karinda*, but not taken later than 12th August, most of the few then being females, whereas *dama karinda* was taken up to 9th September.

A form smaller than the last above mentioned and having a conspicuous pale streak on the hindwing beneath, was taken by Capt. Aldworth at Suwarra in July 1919. This may have been either f. *carmon* or *actis* of the *damon* group. A few specimens were shown to the writer at Mosul.

L. admetus, Esq. Seitz. Vol. 1,81C.

One pair taken by Capt. Aldworth at Suwarra, 4,500 ft., July 1919.

L. baton, sub-sp. **clara,** Stgr. Seitz. I. 79d.

Harir, N. W. Persia, 2♂, 3 ♀. Taken at flowers of mint on damp ground at 5,300 ft.

Not separable in any way as a race distinct from *clara* the Asia Minor-Turkestan subspecies.

Taken also by Capt. Aldworth at Suwarra, Kurdistan, July 1919.

GENUS HEODES (CHRYSOPHANUS, Bdv.)

H. phlœas, L. "The small copper." Seitz. 1.77b.

The spring form is very like the English form, forewing copper with black spots and dark border.

The summer form is like ab. *eleus*, F., the male sometimes appearing as dark on the wing as an *Ypthima*.

Of 48 ♂, 52 ♀ examined (27 ♂, 30 ♀ of these now in B. M.), Capt. Riley remarks:—

"The series shows specimens taken in every month of the year except December and January. February, March, April and May specimens are all of the typical *phlœas* form, and so is the single October specimen.

The remainder, June-September, are of the form *eleus*, and, as is usual with the species throughout its range, very variable. The tendency to blue spotting of the hindwing above is very marked, which seems rather surprising as, in this country at any rate, the increase in these blue marks seems to be the result of a wet habitat. Specimens from lowlying wet pastures usually seem to have them largest. The form has been named *cœruleopuncta*, Staud.

There are such numbers of aberrational names applied to this unfortunate species that it is impossible for me to attach any of them to anything—I am afraid I must disregard them."

Regarding the tendency to blue spotting mentioned by Capt. Riley, it is worth mentioning that the majority of the specimens were taken either in a damp meadow or about the banks of rivers or canals.

Localities.—Mesopotamia, common. Kizil Robat, spring form from February to the end of April. Summer form end of June (bank of Dyala, Jebel Hamrin). N. W. Persia: Karind valley, the dark form very common from mid July and a

few still about in mid September. Baghdad, 28th October to 30th November. (Spring form).

Kermanshah, "Common about cultivated ground and around bramble bushes" (Major Broughton).

H. thersamon, kurdistanica, Ril. A. & M. N. H. Vol. 8, p. 598.

31 ♂, 34 ♀ (18 ♂, 18 ♀ of these now in B. M.) taken at flowers in a meadow and glades at Harir, Karind Gorge and Kermanshah in N. W. Persia. Capt. Riley's note on these runs:—

"These specimens are characterised by their small size on the whole, especially the September ones, and the lack of any fiery tinge in their colouration; they are a much more yellow-gold even than usual in European *thersamon*, though not nearly so golden as *ochimus*.

The underside colouration is more uniform than in typical *thersamon*, the hindwing ground-colour approaching that of the forewing, and the dark spots are much reduced in size. The hindwing tails are comparatively long."

Type ♂, Harir, 19th August 1918; ♀, Harir, 20th August 1918. (B. M.) (Types No. Rh. 181 ♂; 182 ♀).

persica, Mén., was described from N. E. Persia and is said to be a fiery golden colour, large with a dark border.

H. thersamon, Esp. one female, very worn, 17th July 1919, Qasvin. (Buxton).

GENUS CYANIRIS, Dal.

Cyaniris argiolus, L. Seitz. Vol. 1,8 pl.

13 ♂, 7 ♀ (8 ♂, 7 ♀ of these now in B. M.) taken by a brook at Harir (5,300 ft.) in N. W. Persia.

Underside markings very faint on the whole, in some (August) specimens almost entirely absent=f. *hypoleuca*, Koll.

GENUS ZIZERA, M. (ZIZEERIA, Chapman).

Z. karsandra, Seitz. 1.295.

♂ violet blue with broad brown border above. Underside, grey with jet black conspicuous spots, and a black spot in middle of cell of forewing. Female above pale brown. Common, especially about cultivated ground, and widespread. Basra, Amara, Kirkuk, etc., and in Europe and Asia.

Of 11 ♂, 10 ♀ (now in B. M.) and 14 others, Capt. Riley remarks as follows:—

"I call this *karsandra* rather than *lysimon* in view of Chapman's able paper on the group in Trans. Ent. Soc. Lond. 1910, p. 480. He says *lysimon* is African, *karsandra* Asiatic, *inter alia*. These specimens agree with *karsandra* type and with Chapman's figures and description."

Z. otis, Fab. Seitz. 1.295 "♂ Kizil Robat, October 18th" (Lt.-Col. Watney).

"I got another species of *Zizera* (besides *Z. galba*) at Kut, probably *otis*, but the specimens were destroyed by ants" (Broughton).

GENUS CHILADES, M.

C. galba, Lederer. Seitz. 1·77k, described from Palestine. The veining, basal black spots and 2 jewelled black tornal spots on underside of hindwing are more like *Chilades* than *Zizera*; and *Chilades phiala*. Gr. Gr. also in Seitz. Macrolepidoptera, Pl. 77k, and of which the types from Bokhara are in the British Museum, is identical with *galba*. *galba* is abundant in the hot months

about *Acacia campbelli*, Ainoff, which is widespread generally as a stunted bush in Mesopotamia, (though at Kut it grows to five feet), Kurdistan, etc., and is about the same size as *Z. lysimon*.

Of 56 ♂, 46 ♀ (18 ♂, 21 ♀ of these now in B. M.) examined, Capt. Riley remarks:—

"The species is sometimes placed in *Zizera* sometimes in *Chilades*. I don't know which, if either, is correct."

"Apparently not recorded from Mesopotamia before. There is a nice little series in the B. M. from Amara (B. Brewitt-Taylor) taken in July-August 1916."

Although the butterfly is found in immense numbers in June and July about the food-plant, which is also abundant in Mesopotamia, comparatively few larvæ were found. The presence of several small ants about the end of a young shoot generally indicated a larva there. Small predacious wasps and a large red ant frequent these plants and probably carry off many of the larvæ of this butterfly.

A female *Z. galba* was seen to lay an egg on a very small shoot in the axil of a young leaf.

Egg. The egg was immediately examined under a fairly high power microscope. Shape flat and rounded about twice as broad as high, and with a small concavity in the centre above. The surface is covered with prominent tetragonal reticulate white projections on a ground of pale sea-green, the central depression being also pale green.

Larva. De Niceville's description of the larva of *Chilades trochilus* quoted by Col. Bingham, would do very well for this also. The following modification of it is made for *galba*:

> Of the usual wood-louse shape when full grown, seven sixteenths of an inch in length. Head when at rest hidden by the second segment which overlaps the bitten end of the stem like a flap, the larva lying along the stem. Colour pale green at all stages, of the shade of the young leaves of the food-plant (*Acacia campbelli*). The very young larva, just having thrown of its first skin, seen under the microscope shows the brownish black head, segments and hairs very distinctly. The head black, smooth and shining, with a dark green dorsal line down the body from the 3rd to the 12th segments; on either side of this a rather conspicuous pale whitish line, next to it a narrow pale green line, then two parallel narrow pale lines, with a narrow dark green line between them, these being much less distinct. Then a pale green line below which is an almost pure white lateral line below the spiracles, which is the most conspicuous of all the markings. These various parallel lines are divided up by the segmental constrictions which are rather deep. The whole surface of the body slightly shagreened, being seen, under a lens, to be covered with extremely fine short downy hairs, which are more evident at early stages than later. The usual extensile organ on the 12th segment. Each larva is diligently attended by several small brownish black ants which run about over its body, apparently attracted by some secretion from between its segments. The larva takes no notice of the ants running about over it. Mr. C. W. Crawley kindly identified this ant as *Monomorium* (*Paraholeomyrmex*) *gracillimum*, Smith.

Pupa. Three tenths of an inch in length.

Two larvæ, enclosed with the food-plant, on which they were feeding, in a glass shaving soap tube, pupated one on the glass side, one in the angle between this and the bottom, and not on the plant, and were attached to a silk pad formed on the glass; and in one the body-girth was very distinct producing a slight constriction on the pupa. The pupæ examined with a hand lens did not show any hairs on them. In this detail and in the method of pupation

these two pupæ did not conform to the details noted by Dé Niceville for *Chilades laius* and *Ch. trochilus*. Shape short and thick, with constriction behind thorax. Thorax and abdomen dorsally prominent, straight, ventrally smooth. Colour at first green, wing-cases whitish and waxlike and semi-transparent, the abdominal contents appearing opaque. About the 4th day the thorax is grey, eyes black, conspicuous, antennæ brown. Wing-cases pinkish waxlike, abdomen green with the segments indicated. Late on the 5th day after pupation thorax and wing-case become chocolate brown, sharply distinct from the pale brown abdomen.

Both male and female emerged on the 6th day after pupation, at about 8 o'clock in the morning.

By keeping the larvæ and pupæ in the glass shaving soap tube with the cap on, the small destructive black ants were kept off them; whereas the attendant ants left with them did no harm.

Habits. Soon after sunrise the butterflies settle about the plants with their wings half open to the sun; later on they fly about more actively and more often close the wings when they settle. The butterfly is especially abundant in the hot weather in June and July about the food-plant (*Acacia campbelli*).

The very close resemblance of its larva to those of *Chilades laius* and *Ch. trochilus*—the similar venation to that of *Chilades* and the presence of jewelled tornal spots and very prominent basal black spots on the hindwing—and the fact that *Chilades phiala* Gr. Gr. is identical with *galba*, should be considered in deciding whether *galba* should be grouped under *Chilades* or *Zizera*.

Localities.—Mesopotamia: Kut, Kizil Robat, Baiji, etc. S. Kurdistan: Suleimanyeh, Sept. 1.

C. trochilus, Freyer, Seitz. Vol. 1. 77k.

A male taken at a flower on the plateau near Kizil Robat on 25th June 1919.

This is the smallest butterfly of Europe, Mesopotamia and India.

Expanse—0·6 inch.

Ranges from Africa through Arabia and India to Australia.

Genus LAMPIDES (Polyommatus).

L. bæticus, L. "The long tailed Blue." Seitz. I. 77h.

Key: Upperside, male purplish blue; female brown with some blue scaling and often a white band and four dark spots—always two—on hindwing. Beneath: the male banded grey, the female brown, a black spot in interspace, another in interspace 2, margined inwardly with ochraceous and both spots having metallic bluish green scales. It is very active and frequents cultivated ground, especially bean-fields.

Localities.—Mesopotamia—common generally; also widespread.

Genus TARUCUS, M.

T. theophrastus, Fab. Seitz, Vol. 1·77i.

Male. Upperside, pale violet, the markings of the underside apparent through transparency. Underside white with black or brown spots, all or some of the subterminal series on hindwing having shining bluish metallic scales.

Female, upperside dark brown, bases of wings suffused with blue: a white area and black bands and spots on the forewing.

Localities.—Basra, March 1917. (Broughton). Baghdad, Nov. 1920.

Ranges from N. and W. Africa, through Arabia, Persia, to India, Burma and Ceylon. Usually found about the thorny bushes of its food plant *Zizyphus*

jujuba which, as Capt. Buxton remarks regarding this form in Algeria (Entomologists Record, Vol. XXVI), is a perfect terror to one's net. The net once caught on a bush seems to embrace it, and only very careful, patient picking off of every part of the net will save it from rents.

T. mediterraneæ, B. Baker, distinguished by the genitalia, common at Baghdad in September and at Amara in June on Zizyphus trees.

Dr. Chapman and Capt. P. A. Buxton, R.A.M.C., have recently contributed an interesting illustrated article on the life history of this race, which is common at Amara, in the "Entomolgist's Monthly Magazine" 3rd series, Vol. V, p. 163.

T. balcanicus areshanus, B. Baker, Amara, April and Baghdad, September. The locality of the type specimen is Geok Tepe in Transcaucasia near Elizabetpol, and not the more famous place of the same name in Transcaspia. Also obtained at Suleimanyeh in September.

Subfam. THECLINÆ.

Genus APHNAEUS.

A. epargyros marginalis, Riley A. & M. N. H., Vol. 8, p. 598.

N. W. Persia, Paitak, 6-7th August 1918. Suleimanyeh, Kurdistan 1st September 1919; 4 ♂, 9 ♀ (all except 3 ♀ are now in B. M.).

On willows by a stream at Paitak, 2,500 ft. at the foot of the Takigerra Pass. A few, in very worn condition, by the Kalisan stream at Suleimanyeh. Capt. Riley notes on these:—

"Differs from typical *epargyros* (as represented in the B. M. by 13 ♂, 8 ♀ from Persia, Turkestan, etc.) which was described from the Aral Sea region, by its much smaller size, darker ground colour, and the great increase in the size of the black markings above. The submarginal band of the forewing extends to the marginal line, thus forming a broad band which posteriorly joins the median transverse band. The triangular patch of ground-colour so enclosed is nearly half filled by the four black spots between vein 4 and the costa. The black markings of hindwing are correspondingly larger.

On the underside the ground colour is greenish grey, not silver-grey as in typical *epargyros*, and the irregular blotches which in *epargyros* are ochreous, are similarly slightly greenish. The blotches themselves are more rounded, neater and the whole underside has a more delicate appearance than it has in the typical form."

B. M. Types No. Rh. 183 ♂; 184 ♀, Paitak, 6th August 1918.

N.B.—Since its description by Eversmann (1854) *epargyros* has always been regarded as a synonym of *acamas*, Klug. A reference, however, to the original descriptions and figures clearly shews the distinguishing features of the two species. *Acamas* always has the base of the forewing as far as the origin of vein 2, and usually also the whole, or greater part, of proximal half of hindwing grey. In *epargyros* the yellow ground colour extends right up to the base of the wing. In *epargyros* any light yellow area in the forewing is confined to area 6; in *acamas* the lighter areas are sometimes white and may extend into the cell and into areas 5 and 4. But the readiest means of separating the two species is by the shape of the submarginal band of the forewing below. In *acamas* this is an even band (or comparatively so) with a straight inner edge, or bordered by a series of narrow straight lines; in *epargyros*, as stated very clearly by Eversmann, it is made up of a series of very decided crescents, their convex sides inwards.

A., acamas subsp. **hypargyros,** Butler.

N. W. Persia, Harir, 9-19th August 1918; 11 ♂, 4 ♀ (all except 5 ♂ are now in B. M.)

Common among rocks and boulders, and some at mint-flowers, in Harir Gorge 5,400 ft. Capt. Riley notes :—

"Typical *acamas*, described from 'Syria and Arabia' is a brighter insect with much less heavy black markings of upperside, and the markings of the underside cloudier in appearance than in *hypargyros*. It has a softer general appearance, Swinhoe's figures in Lep. Ind. 8, are misleading. Fig. 1 and 1b are from a ♂ of *epargyros* from Persia. Fig. 1a is a ♀ *acamas hypargyros* from Chaman. Both specimens are in the British Museum. Typical *acamas* does not appear to occur east of the Euphrates."

GENUS CIGARITIS.

C. maxima, Stud. Seitz, Vol. 1, p. 279.

Harir, 15th July to 9th August 1918; 2 ♂, 3 ♀ (now in B. M.)

Taken about open ground near stream; the date being apparently late for this species. Taken also by Aldworth at Suwarra, above Mosul, July 1919.

Capt. Riley remarks :—"*Maxima* is usually considered a var. of *cilissa*. I consider it a good species. The general pattern of underside in each is similar, but there are small and constant differences."

N.B.—Type of *Aphnœus* is African and differs morphologically from the so called *Aphnœus* of India, &c.

GENUS ZEPHYRUS.

Z. quercus, longicauda, Riley. A. & M. N. H., Vol. 8, p. 599, and see Plate, Fig. 5·6.

Karind Gorge, 13-17th July 1918; 24 ♂, 25 ♀ (12 pairs now in B. M. collection).

Paitak, 7th August 1918, 1 ♂.

Harir, 20th August 1918, 1 ♀.

Suwarra (ex Aldworth), 1 ♂, 1 ♀ (=ab. *bellus*), early July 1919.

Capt. Riley's note on these runs :—"A well marked local race. It is distinguished from the typical European *quercus* by its generally rather larger size, the brighter and more brilliant colour of the upperside of the male, and the great increase in the length of the tails. These measure 3-4 mm. consistently against 1-2 mm. in European specimens. On the underside the general colouration is much lighter grey, the transverse white bands much straighter; the submarginal markings on the forewing, with the exception of those in areas 1b and 2 which are large, dark and prominent, are almost absent. The anal lobe of the hindwing much larger than in typical *quercus* and the black spot which covers it consequently at least twice the size of that in *quercus*.

Three males and two females, one of the latter a beautiful example of ab. *bellus*, Gerh., taken at Suwarra, Kurdistan, 4,300 ft. in early July 1919, and one male from Lekkoran, 30th June 1914, (ex. Christoph. collection) all of which are in the B. M. are also referable to this *longicauda*. Although the males lack the brilliance of upperside colouration characteristic of typical *longicauda*, in this respect more resembling normal *quercus*, in all other points they agree with *longicauda*."

B. M. Types No. Rh. 185 ♂; 186 ♀, 16th July 1918, Karind Gorge.

This form was common settled in considerable numbers on the upper and undersides of leaves, sometimes more than one on a leaf, of mulberry

at Karind Gorge (6,000 ft.) in very fresh condition on 13th July, the fruit on the tree being then not yet ripe. One taken 7th August at Paitak 2,500 ft. and another at flowering mint on 19th August at Harir 5,300 ft.

GENUS STRYMON.

S. abdominalis, Gerhardi, f. gerhard, Staud. Seitz, Vol. 1, 73 c. see plate Figs. 3 4.

3 ♀, 13-17th July 1918 (now in B. M. Karind Gorge, 6,000 ft.)

Capt. Riley notes:—" *S. abdominalis*, Gerh, is usually regarded as a form of *S. acaciæ*, Fab. The two forms occur together over a wide range, extending from Asia Minor to Persia, and throughout are easily separable, the most conspicuous difference being afforded by the dark spots at anal angle of forewing underside. These are invariably absent in *acaciæ* and just as invariably present in *abdominalis*.

One specimen taken flying about a small tree about 8 feet from the ground, another near the ground, at the border of a wood."

S. ilicis caudatula, Zell. Seitz, Vol. 1·736.

1 ♀, Karind Gorge, 14th July 1918.

Not previously recorded from Persia, the nearest record being Lenkoran (S. E. Transcaucasus).

S. marcidus, Riley. A. & M. N. H., Vol. 8., p. 600, See plate Fig.

1 ♀, Harir 15 July 1918, 5,300 ft. type.

1 ♀, Karind Gorge 16th July 1918, 6,000 ft. co-type. Both now in B. M.

Capt. N. D. Riley's description is as follows:—

♀ *Upperside, both wings.*—Dark brown, immaculate, a fine anticiliary line more conspicuous on the hindwings, fringes whitish, especially on hindwings.

Hindwing.—Anal lobe yellowish, and some yellowish scaling close to margin in areas 1b and 2.

Underside, both wings.—Pale yellowish grey, fringes of same colour, preceded by a very fine darker marginal line which is separated from a very indistinct submarginal shadowy dusky band by only a narrow white line.

Forewing.—A band of white linear spots runs from costa to vein 1, the spots being limited by the veins and inwardly margined with black, the band following almost exactly the curve of the hindmargin. The lowest spot (in area 1b) is characteristic, being crescentic, the concave side facing outward, and as fully developed as the other spots in the series.

Hindwing.—The transverse white band is similar to that of forewing but slightly broader and less interrupted, follows almost exactly the curve of the hindmargin, and in areas 1c, 2 and 3 is composed of V shaped spots the apex directed inwardly. There is a submarginal series of spots, of which that in area 2 is large and black, inwardly bordered with yellow, black then white; those in areas 3, 4 and 5 small black, ringed with paler, diminishing in size so that the one in area 5 is barely traceable. Anal lobe black with some whitish and yellowish scaling above it, which merges into the last spot of the transverse white band. Between anal lobe and large spot in area 2 black and bluish grey scaling (the exact nature of this area cannot definitely be stated, as the bulk of it is in both specimens completely missing).

Length of forewing, 16 mm. B. M. Type, No. Rh. 187.

Comes near *S. abdominalis*, but the different contour of the transverse band of underside and the absence of the dark marks at anal angle of forewing beneath readily separate it from that.

HESPERIIDÆ.

Genus CARCHARODUS, Hbn.

C. alceæ, Esp. (=**malvarum**, Hoff. **malvæ**, F. Hb. Bdv). Seitz. 1 85a. Kane XV. fig. 1. 40 ♂, 29 ♀ (25 ♂, 26 ♀, now in B. M.)

Varies in colour. Warm brown dappled with sepia, and having transparent white marks. Wings and margin of same chequered with brown and white dentations. In the hottest months some examples are of a pale reddish colour. A sandy brown female, taken July 11th, 1919, at Kizil Robat, is unlike any already at the Brit. Mus.; a second similar example was taken.

Of the 69 specimens above mentioned, Capt. Riley notes :—

"I cannot agree with LeCerf in regarding *swinhœi* as a distinct species. The type (and a considerable series from type locality) is in the B. M. and does not shew the peculiarities which he attributes to it and on which he separates it from *alceæ*. As a local race it is probably justifiable enough. His ab. *isolatrix*, judging by the long series obtained by Lt.-Col. Peile, would appear to be an extreme dry season form. Four ♂ and some 10 ♀ all taken during June and July are of this form, though only one ♀ is so extremely pale as the specimen figured by LeCerf.

January and February specimens are as dark as the normal European ones, and it is very instructive to note how the species get gradually paler during April-May till the extreme is reached in June and July, after which they gradually darken again. It is almost possible to tell the month of capture from the colouration of the specimen."

Localities.—Mesopotamia: Jebel Hamrin, R. Dyala, June. Kizil Robat (Mirjana), Feb., April, May, June, July. Khanikin, October. Baghdad, August, October, November. N. Persia: Harir, Karind Gorge, Kermanshah, very common. (Broughton), Qasvin, July; Baghdad, September-October (Buxton). S. Kurdistan: Suleimanyeh, September. Widespread and abundant in Europe, also Baluchistan, Kashmir and Chitral.

C. altheæ bœticus, Rambur. Seitz, Vol. 1, 85 a.

Harir, 10th August 1918, 1 ♂.

Genus GEGENES, Hbn.

G. nostrodamus, Fab. Seitz. 1. 88 c.

Smoky black, unspotted; female with yellowish marks on discoidal cell of forewing. 15 ♂, 6 ♀ (9 ♂, 5 ♂ now in B. M.), Baghdad, Jebel Hamrin (Dyala).

Localities—Mesopotamia: Kizil Robat, May; Khanikin, October. Range; S. Europe, W. & C. Asia.

G. lefebvrei. Rambur. Seitz, Vol. 1, p. 349.

One male, Kirkuk, 18th October 1919.

It is questionable whether this is specifically distinct from, or only a form of *G. nostrodamus*, Fabr.

Genus THYMELICUS

T. lineola, Ochs. Seitz. Vol. 1·87 f.

Pale reddish yellow; wings narrowly bordered with black, a short stigma on the forewing in males. Mosul, April, one female (Watney). Range: Europe, N. and W. C. Asia, N. Africa.

Is very like 'The small skipper.'

GENUS HESPERIA, Latr.

H. geron, Watson, Seitz. Vol. 1·85 d.

Brown with numerous white spots. Exp. 1 to 1·25 in Kane XV. 11. Described from Quetta, but the name was a M. S. one of Zellers' who had it from Shahrud in N. Persia. 3 ♀, 2 ♀ (now in B. M.) and 1 ♂, 1 ♀.

Localities.—Mesopotamia: Kizil Robat, May. S. Kurdistan, Suleimanyeh, September. N. Persia, Kermanshah (Broughton). Range: Baluchistan to N. Persia; also Turkey and Greece.

H. proto, Esp. Seitz Vol. 1·85 d. Kane Pl. XV. 4. Brown, basal half of wings covered with yellowish fur and having dull yellowish spots and margin. with serrated pattern on margin of hindwing. 3♂, 6♀ (now in B. M.) and 2♂.

Localities.—Mirjana (= Kizil Robat), May, November. Khankin, October Also in Europe. N. W. Persia, Takigerra Pass, Harir.

H alvéus, Hbn. Seitz, Vol. 1, 85 b.

Kermanshah, 24th August 1918, 1 ♀.

H. orbifer, hilaris, Staud. Seitz, Vol. 1 p. 336.

Harir, Karind Gorge and Kermanshah, 12-24th August 1918, 6 ♂, 2 ♀ (now in B. M.) and another ♂.

H. orbifer, Hüb.

One specimen, Qasvin, September (Buxton).

GENUS PARNARA

P. mathias, Fab. Seitz, Vol. 1, 88 f. g.

Kizil Robat and Baghdad, July, September, November, 3♂, 2 ♀ (now in B. M.) common at Amara, June to November and bred in November on great millet (*Gorghum vulgare*); 10 days in pupa. It is not a pest. Noticed sleeping on the upper surface of apricot leaves just before sun down (Buxton).

GENUS EOGENES.

E. alcides, H. S., Seitz, Vol. 1, 88 e.

Suleimanyeh, September 1st, 3 ♂

Paitak, 1 ♂ August 1918 (now in B. M.).

GENUS THANAOS.

T. marloyi, Bdv. Seitz, Vol. 1, 86 d.

Harir, 16th August 1918, 11 ♂ Common in sheltered spots amongst bare rocky hills at Menzil at end of March.

Thanaos tages, var. **unicolor,** Freyer. Seitz, Vol. 1, 86 c.

Suwarra, one male (Capt. Aldworth).

Note.—Captain Stoneham's records of *Vanessa io* and *urticæ* and of *Pontia chloridice* are now considered incorrect.

The reproduction of the plate by Messrs. Bale Sons and Danielsson is excellent.

For Map of this region see. Vol. XXVII, No. 2, p. 322.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, MAY 25, 1922.]

"THE BIRDS OF MESOPOTAMIA."

BY

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ASSISTED BY

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AND

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PART II

(*With 2 plates.*)

Continued from page 250 of this Volume.

66. Grey Hypocolius. Hypocolius ampelinus.

Hypocolius ampelinus, Bb. (Consp. Av. I., p. 336, 1850—Abyssinian Coast).

This species is evidently a very local bird in Mesopotamia and its status not satisfactorily cleared up. Some observers did not meet with it at all and others who came across it found it locally common. To Cumming belongs the credit of first describing the nesting habits of this extraordinary bird (Ibis, 1886, p. 479) which were previously unknown, and he supplemented his observations in the B. N. H. S. Journal (12, p. 760); since then nothing has been written about it of any moment. Cumming considered that at Fao it was a summer visitor arriving early in April from the S. E., but Zarudny records that it winters in small numbers in the Karun district, where however it is commoner in the breeding season. Pitman too found it plentiful in the Adhaim river from September 24th up to the time he left there on November 17th, so that it seems certain that some at all events pass the winter in the country.

Buxton, who met with this species at Amara in June, considered it to be a bird of the date palms, which opinion coincides with Cumming's. He describes it as a very sprightly bird, very active and restless, frequenting the young palms and running up and down the stems of the leaves like a Babbler; the black nape feathers can be erected into a small crest under excitement. He describes the flight as long, rapid and straight, 300-400 yards at a time, the tail being held straight behind. Pitman found his colony on the Adhaim frequenting low scrub jungle which on both banks extend for nearly a mile between fairly high cliffs. This scrub, almost impenetrable in places, consisted of acacia, tamarisk, poplar and willow, and the *Hypocolius* invariably preferred the parts containing poplar. Where they occurred they were exceedingly plentiful from September 24th to November 17th; in addition to Buxton's notes on their flight and habits he says "when a flock comes down to a bush they often wheel swiftly several times like a flock of sparrows do, or else they drop head first towards their objective and steady themselves at the end by cocking up their long tails over their backs. They usually keep on the outside of the bushes when

searching for insects, and I have never seen them come down to the ground. They have an unmistakable squeaking note and often a large flock is very noisy and can be heard quite a long way off. I have occasionally found them at dusk roosting on the thorny bushes. The males are very fond of sitting up at the top of a bush, elevating their black crests and jerking their tails up and down, and while creeping about a bush their tails are constantly being moved. When sitting on the alert they are very conspicuous on the tip-tops of a thorny leafless bush, their long bodies held straight up, tails down and head and neck rather stretched up in a position of alertness and attention. Frightened they suddenly wheel off at a tremendous pace, all going off at the same instant. The flocks consist of six to twenty individuals."

Concerning their habits in the breeding season, Cheesman, who found a colony at Sera on the Tigris in scrub jungle, says the pairs often pack into a flock; on settling, their call, actions and appearance were similar to those of a Babbler and pairs often indulge in love flights, flying round 100 to 150 feet up in the air. They were building in the scrub on May 1st and he found a nest in a low bush two feet from the ground in open scrub; the nest, which was being built of coarse grass stems, was in the centre of a bush, not at all hidden, and the birds were not shy. Cumming records that they breed at Fao in the middle of June and he found the first eggs on June 13th; the nests there are placed on the date palm leaves three to five, occasionally ten feet up, and four is the usual number of eggs. He describes the eggs as glossy white with lead-colour blotches and spots towards the large end and at times over the whole egg. Tomlinson on the Karun R. found nests with four and five eggs on May 24th.

Their food consists of "insects" (Pitman), while Ingoldby saw these birds gorging themselves on ripening dates at Baghdad, and Cheesman found gizzards of birds obtained full of the luscious red berries of *Lycium europœum.*

Bare records of this bird were received from Baghdad, near Amara, Museyib and Basra in the breeding season.

The bill is black and the legs flesh colored.

Spirit specimens of adults and newly hatched young are great *desiderata.*

Eleven specimens examined: ♂ ♀, Amara, 24-6-18 (P. A. B.); Baghdad, 7-8-17, 2-10-17 (two) (Ingoldby); ♂, Adhaim, 30-9-17, 9-10-17 (two) (C. R. P.); ♂ ♂ ♀, Sera, 30-4-19 (P. Z. C. and R. E. C.).

67. White-eared Bulbul. Pycnonotus leucotis.

*Pycnonotus leucotis, mesopotamiæ** C. B. Ticehurst (B.N.H.S.J. 26, (p. 279, 1918—Basra). Type now B. M.

This race of Bulbul is common and resident in palm groves and gardens from Fao and Shustar to Baghdad on the Tigris, and to Museyib on the Euphrates; higher up on the two rivers at Samarra, Tekrit, Mosul and at Feluja, Ramadi and Hit their absence was remarked on, as it was at Khanikin on the frontier, which place Buxton visited twice; nor is any Bulbul recorded at Urfa by Weigold. Some of these places are doubtless unsuited to its habits, though others, such as Khanikin, appeared to be suitable in every way. Away from the date palm and garden area it seldom occurs but Pitman found it inhabiting reed beds near Kurna far from any trees.

It breeds from April to July; Buxton found young hatched by May 1st when most were yet building, and in September saw partly fledged young, so that probably two or more broods are reared. The middle of May appears to be the time for fresh clutches of eggs. Tomlinson says three, rarely four, is the usual number of eggs and three certainly seems to be the common number, but Cumming at Fao records a nest of five. The nests are situated in almost any bush, especially date palms, and a nest is reported as situated in a reed frame sup-

* By a printer's error spelt *mesopotamia.*

porting melon plants. The nests are small cups, made of fine grass and small twigs, lined with finer grass and date palm fibre with a little "cottony" material.

21 specimens examined: ♂ ♀, Hilla, 16-3-19; ♀, Khazimain, 15-2-19, ♀, 13-11-18; ♂, Basra, 19-4-17 (P. Z. C. and R. E. C.); ♀, Shustar, 20-1-18; (F. M. B.); ♂, Amara, 28-3-18 (P. A. B.); 4 Nahr Umar, 25-3-18 (C. R. P.) ♂ Basra, 20-11-17 *type*; 4♂, 3♀, 17-19--3-18 (C. B. T.).

Ixos leucotis of Gould was described from "In India orientali" (P. Z. S., 1836, p. 6); here there is nothing to shew whence Gould obtained his specimens but it is known that his son collected in Sind and sent his father specimens; I therefore designate Karachi in Sind as the restricted type locality for the typical race.

In the Bombay Journal (*loc. cit.*) I described the Bulbul of Mesopotamia as a new race of the Indian bird, characterized by its rather longer wing and tail and larger bill, the yellow rim round the eyelids and rather darker underparts. I described it from a series obtained in Basra and these birds had markedly dark underparts. I have since seen more of these Bulbuls from elsewhere in Mesopotamia and I am not sure that this last character holds *so markedly* as I at first thought. I find all birds from Basra are darker than from elsewhere in Mesopotamia, and I think it is due to grime from the many steamers which anchored there during the war. I particularly noticed it to be the case with the *Prinia* and *Francolinus*.

The other characters however hold good, *viz.*, yellow eye rim, longer wing and tail, and larger bill. Hartert (Vog. P. Fauna, p. 462) gives measurements of *leucotis* as wing 91-94, tail 86-92 mm. A number of Sind males however measure: wing 83-88, tail 80-89 m.m.

Pitman records that on May 25th near Feluja where this Bulbul does not occur, he saw a pair of Bulbuls which had no white on the cheeks and whose general colour was dull smokey brown. Possibly *P. capensis xanthopygos* occurs here and in some other parts, but the question requires further investigation before this, the Palestine Bulbul, can be admitted to the fauna.

68. Spotted Flycatcher. Muscicapa grisola.

(1) *Muscicapa grisola grisola*, L. (Syst. Nat. Ed. 12, I, p. 328, 1766—Europe).

(2) *Muscicapa grisola neumanni*, Poche (Orn. Monats., 1904, p. 26, N. W. Massailand).

The Spotted Flycatcher is a passage migrant in fair numbers, arriving rather late in spring; the first may be looked for about the middle of April and they are numerous later in the month; some are found throughout May, and Buxton noted them at Amara until the second week in June, but there was no indication of their breeding there. The return passage begins about September 10th and they are common all the month. Buxton found them still common at Amara on October 25th, but they soon after disappeared. During their passages they are widely distributed throughout the region.

Weigold, who found the species common on spring passage at Urfa (April 15th—30th) is inclined to think his specimens belong to the Eastern form *neumanni*.

(1) Twelve skins examined: ♂, Amara, 27-5-18 (two); ♂ ♀, 9-9-18, ♂ 4-10-17 (P. A. B.); Tekrit, 17-4-19; S. Saad, 16-91-7; Shaiba, 23-9-16 (P. Z. C. and R. E. C.); Basra, 1918 (Hobkirk).

All these are the paler *neumanni*, which probably, is the commoner of the two races. It nests in small numbers as near as the Zagros (Zarudny).

(2) 2, Feluja, 8-5-17 (C. R. P.); Basra, 5-5-17 (L. Home).

These belong to the typical European race. It is interesting to note that these were all got about the same day and perhaps represented a wave of migration of this race.

69. Pied Flycatcher **Muscicapa atricapilla.**

(1) *Muscicapa atricapilla atricapilla*, L. (Syst. Nat. Ed. 12, p. 326—1766, —Sweden).

(2) *Muscicapa atricapilla semitorquata*, Hom. (Zeit. ges. Orn. 2, p. 185, 1885—Caucasus).

(1) Noted by Weigold at Urfa on April 15th and fairly common on passage for a few days.

(2) This race arrived at Urfa and passed through before *collaris*. It arrived on April 11th and was common up to 19th.

Buxton saw a Pied Flycatcher of sorts at Baghdad on September 25th and Stoneham records a pair at Samarra on April 10th.

This race must surely occur more numerously in Mesopotamia ? I may here record that on March 22nd a male Pied Flycatcher came on board near Tanb Islands in the Persian Gulf and left, going north, when the Persian shore became visible near Bunder Abbas. I had it repeatedly within a few yards of me.

Cumming obtained a male in January 1887 and a female on August 29th, 1886, at Fao. These are in the British Museum and Mr. Kinnear has identified them as belonging to this race.

70. Collared Flycatcher. **Muscicapa collaris.**

Muscicapa collaris, Bechst. (Gem. Naturg. Deutschl., 4, p. 495, 1795—Thuringerwald, Central Germany).

The only records of this species are those of Weigold who found it common at Urfa on passage between April 15th and 21st. Its migration route would not seem to pass over middle and lower Mesopotamia.

71. Red-breasted Flycatcher. **Muscicapa parva.**

Muscicapa parva parva, Bechst. (Latham's allg. Urbers d. Vogel 2, p. 356, 1794—Thuringerwald).

The only record is that of Cumming who got one at Fao on October 10th, 1884.

72. Chiffchaff. **Phylloscopus collybita.**

(1) *Phylloscopus collybita collybita*, Vieillot. (N. Dict. d'Hist. Nat., 11, 1817, p. 235—France).

(2) *Phylloscopus collybita abietina*, Nilsson (Kgl. Vat-Akad. Handl., 1819, p. 115—Sweden).

(3) *Phylloscopus collybita tristis*, Blyth. (J. A. S. B., 12, 1843, p. 966 —Calcutta).

(4) *Phylloscopus collybita sindianus*, Brooks (Stray Feathers, p. 476, 1880—Sind).

None of the *Phylloscopi* were differentiated in the field and so the various species and races can practically only be dealt with from specimens obtained, The Chiffchaffs are common winter visitors throughout the area in suitable situations such as gardens, crops, scrub, reeds, etc. They appear to arrive late, as the earliest record is of one obtained on October 26th ; after that they are fairly common though it seems likely many pass through to winter further south, as a great increase in numbers is noted by several observers in the last week in March on return passage. Cheesman heard them in song at Khazimain on March 16th and Pitman near Basra on March 26th. They move north early in April, the latest date for *collybita* is April 5th and of *abietina* April 22nd.

(1) Judging by the skins received, the typical race is perhaps the commonest and certainly the first two and probably also *tristis* over-winter. Weigold does not record the typical race from Urfa and Zarudny says it is a rare passage migrant in the Karun district, which is somewhat strange both in view of our records and that of Woosnam's, whose skins from that area (February 14th to March 26th) according to Witherby all belong to the typical race.

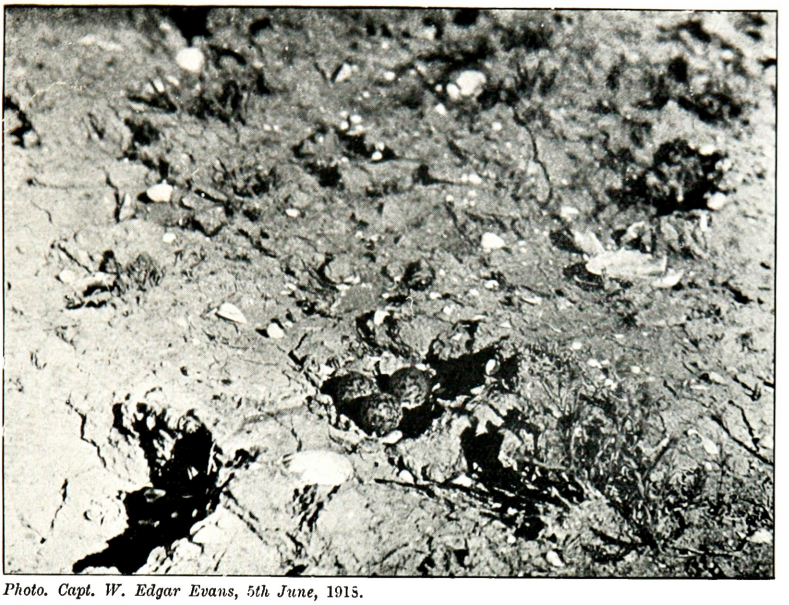

Photo. Capt. W. Edgar Evans, 5th June, 1915.

A.—Kentish Plover's nest on shelly clay, margin of large marsh below Amara. Eggs (3), almost hatching.

Photo. Capt. C. R. Pitman.

B.—A salt pan about ½ mile W. of Euphrates barrage. 3-6-17. Typical breeding ground of Little Ringed Plover, Common Tern, Kentish Plover, Little Tern, Pratincole, and White-tailed Lapwing. Nest of latter in foreground.

17 skins examined: Amara, 5-4-18, 18-12-17, 13-3-18, ♀, 1-11-17, ♂, 24-3-18; Kumait, 13-11-17 (P. A. B.); Shustar, 4-1-18 (F. M. B.); ♂, Sheik Saad, 24-3-17, 14-12-16; ♂, 14-3-17 (P. Z. C. and R. E. C.); Nahr Umar, 24-3-18; Samarra, 5-2-18, 6-3-18 (two); Feluja, 22-3-17 (two); Shat-al-Adhaim, 15-11-17 (C. R. P.). Wings both sexes 55-62; possibly odd ones of these (unsexed) may belong to the race *abietina*.

(2) Weigold states that this race was the commonest small bird at Urfa from April 10th to 23rd and that all were females, the males having probably passed through. He says his skins are not quite typical (wing 56-58) but on geographical grounds he considers them to be of this race! I can only remark that many females of the typical race are within his measurements and that assuming what you wish to prove does not always lead to accuracy. Zarudny gives it as a winter visitor and passage migrant in the Karun district.

12 skins examined: ♂, Amara, 21-1-18, 12-3-18; Ali Gharbi, 3-3-18 (P. A. B.); ♀, Busra, 22-4-17; ♂, Sheik Saad, 29-3-17; Khazimain, 6-4-19 (two) (P. Z. C. and R. E. C.) Samarra, 3-18, 13-12-17, 5-2-18 (C. R. P.); Basra, ♀, 18-3-18, ♀, 20-11-17 (C. B. T.).

Wings ♂, 63-68·5. ♀, 58-60·5 m.m.

(3) The Siberian Chiffchaff is probably commoner than records indicate; we have two skins only, obtained as follows:— ♂, Amara, 26-10-17 (P. A. B.); ♀, Kazimain, 16-3-19 (P. Z. C. and R. E. C.). Zarudny records it as a winter visitor and Cumming met with it at Fao in March and May.

(4) A Chiffchaff obtained by myself at Basra on November 20th, 1917, I cannot refer to any of these three races. It lacks all green and yellow coloration in the plumage, even the edges of the wings have no greenish wash. This specimen matches pretty well a series of *sindianus* which I obtained in the type locality, except that its bill is a trifle larger than most, and to this race I must refer it. *P. c. sindianus* is very close to *Ph. neglectus lorenzii* which is a rather rare bird and of apparently limited distribution (Caucasus), and this might be expected to occur in Mesopotamia. The coloration of the upper and underparts are precisely the same in both, the only differences I can see are (1) in *sindianus*—the bend of wing, under wing coverts and axillaries are *pale yellow*, not *white* or *isabelline white* as in *lorenzii*; (2) the wing formula is slightly different,—in *sindianus* the second is equal to the ninth, or between this and the eighth or tenth, whereas in *lorenzii* it is equal to the eighth or between this and the seventh. In these characters my Basra bird resembles *sindianus* and not *lorenzii*.

73. Willow Wren. Phylloscopus trochilus.

(1) *Phylloscopus trochilus, trochilus* L. (Syst. Nat. Ed., x., p. 188, 1758—England).

(2) *Phylloscopus trochilus eversmanni*, Bp. (Consp., Av. 1, p. 289, 1850—Kazan and Orenberg in Russia).

The Willow Wrens are spring and autumn passage migrants, both races passing through about the same time. A few arrive in March; Cumming records it on March 17th and there were a few at Basra on the 20th; most however come in the first half of April; they pass through again in September, all our records relating to the last three weeks of the month. Weigold noted numbers of the typical race at Urfa from April 10th to 19th and also obtained two of the eastern race (*eversmanni*) on the 10th. Zarudny lists the latter as a winter visitor!

(1) Four skins examined: ♂, Amara, 17-4-18, ♀, 18 9-18 (P. A. B.); Basra, 19-4-17; Khazimain, 6-4-19 (P. Z. C. and R. E. C.).

(2) Three skins examined: ♂ Amara, 18-9-18, ♀, 18-9-18; Baghdad, 21-9-17 (P. A. B.).

74. Plain Willow Wren. Phylloscopus neglectus.

Phylloscopus neglectus neglectus, Hume (Ibis, 1870, p. 143—Punjab).

Noted by Zarudny as a winter visitor to the Karun district; it breeds according to him in the Zagros in small numbers. It should be fairly common in Mesopotamia, but we have no records of it.

75. Bonelli's Warbler. Phylloscopus bonelli.

Phylloscopus bonelli orientalis, Brehm. (Vogelfang. p. 332, 1855—Wady Halfa).

The Eastern Bonelli's Warbler was met with at Urfa by Weigold during spring migration from April 12th to 22nd; he remarks that it was not common, singly or in pairs.

76. Wood Wren. Phylloscopus sibilatrix.

Phylloscopus sibilatrix sibilatrix, Bechst. (Naturforschev., 27, p. 47, 1793—Thuringan).

Also recorded by Weigold from Urfa as rather uncommon on passage from April 13th to 18th; he remarks that specimens obtained are not paler than German ones. So far we have no records of either of these Warblers.

77. Cetti's Warbler. Cettia cetti.

? *Cettia cetti orientalis*, Trist. (Ibis, 1867, p. 79—Palestine).

The status of this Warbler in Mesopotamia is unknown and the records are few. Buxton heard it near Baghdad on September 17th and again at Amara on November 6th, while he obtained two specimens at the latter place on September 28th and January 9th.

There is a specimen from Fao, November 4th, in the B. M. and Weigold obtained seven males at Urfa between April 12th and 22nd where there were several in the gardens. He thinks his specimens belong to the typical race and gives the wing measurements as 62-68 mm. These Urfa birds appear to me to be much too large for the typical race which usually measure 60-62; he mentions nothing about the colour. These three Mesopotamian birds are too pale for *cetti*, especially on flanks and undertail coverts and match well in this respect Larkhana birds, topo types of *cettioides*, however they are rather small for this, one male 66, and two unsexed 65 and 58. Now five males from Larkhana measure 65.69. 71.71.73 mm.; (perhaps the first is wrongly sexed) and two females 61 and 63·5 mm.; four males from Kohat and Khandahar measure 68·5—72·5 mm., and female 60, so that one may say that usually this race has a wing of 68·5-73 in males and 60—63·5 in females. One would like to see more Mesopotamian specimens but for the present I am inclined to place these under *orientalis* of Tristram whose type came from Palestine rather than under *cettioides*. Palestine specimens seem to be scarce in collections, there is one in the B. M. and one in the Tring Museum; both of these I have examined; they do not seem to me to be distinguishable in colour from Sind birds, but are perhaps a little smaller, wing, ♂, 64·5, ♀57 mm., but until more Palestine specimens can be examined it cannot be considered settled whether *orientalis* is a sufficiently distinguishable race.

78. Moustached Sedge Warbler. Lusciniola melanopogon.

Lusciniola melanopogon mimica, Mad. (1903—Flugblatt, Transcaspia).

Buxton met with this species in the Hor Hawizie, south-east of Amara, on July 13th where it was common in the sedges on the edge of the huge marsh and evidently breeding. He obtained three adults in very worn plumage, the organs of one of which were much enlarged. These skins are so poor that it is impossible to say which race they belong to. However I saw two or three in reedy dykes

at Basra on November 20th and obtained one which undoubtedly belongs to the Eastern race. The above records tend to shew that this bird is resident, but further confirmation is desirable.

79. River Warbler. Locustella fluviatilis.

Locustella fluviatilis, Wolf (Meyer and Wolf's Taschenb. d, deutsch, Vog. 1, p. 229, 1810—R. Don in Austria).

A single specimen was obtained by Venning at Basra on May 11th, 1918 ; it is pretty certain to have been a passage migrant. The occurrence of this species is not unexpected as it occurs in the Ural Range and has been obtained in Asia Minor and Palestine (Hartert. Vog. Pal.)

The Eastern Grasshopper Warbler (*L. n. straminea*) and Savi's Warbler (*L. luscinioides*) may both be expected to occur.

80. Great Reed Warbler. Acrocephalus arundinaceus.

Acrocephalus arundinaceus zarudnyi, Hart. (Bull. B. O. C., 21, p. 26—Djarkent in Turkestan).

The records and notes about Great Reed Warblers are not many and rather confused as the different kinds were not recognized in some cases. It can however be confidently stated that the Eastern Great Reed Warbler is a passage migrant through Mesopotamia in spring and autumn. Pitman noted that the spring passage lasted at Feluja from April 20th to 29th and Buxton records a sudden rush at Amara on May 7th. Cheesman saw two at Sheik Saad as early as April 3rd. Cumming records it as a double passage migrant at Fao. Pitman records the return passage during the first week of September at Baghdad. Odd birds may winter in Mesopotamia as Woosnam obtained one at Ahwaz on February 28th and Zarudny lists it as wintering in the Karun district, as well as being a passage migrant.

There is no evidence so far of its breeding in our area. Buxton, who worked the huge marshes to the east of Amara during the nesting season, failed to see or hear an *Acrocephalus* at all. On passage this bird affects bean and pea rows in the absence of reed beds.

Ten specimens examined : Basra, 31-7-18 ; Sheik Saad, 3-4-17 (two); Baghdad, 31-8-17 (P. Z. C. and R. E. C.) ; Feluja, 21-4-17 (two) ; 29-4-17 (two) (C. R. P) ; ♂ ♀, Amara, 7-5-18 (P. A. B.).

The specimens obtained are certainly too pale on the back, rump and flanks for the typical race and correspond best with *zarudnyi*, which race Weigold also records from Urfa on April 20th.

Zarudny records the Eastern Clamorous Reed Warbler (*Acrocephalus stentoreus brunnescens* as wintering in the Karun district. We have no definite records of it and no specimens were obtained, and in view of the discovery of *Acrocephalus babylonicus* I hesitate to accept Zarudny's record.

81. Babylonian Reed Warbler. Acrocephalus babylonicus.

Acrocephalus babylonicus C. B. Ticehurst (Bull. B. O. C., 253, pp. 12-13, 1920—Basra).

In working out the collection I found some specimens of Reed Warbler which evidently belonged to no known race or species and I described it therefore as new (*supra l. c.*).

We have in Mesopotamia three Reed Warblers at least, *viz.*, the Common Reed Warbler (*Ac. scirpaceus*), a small bird, the Great Reed Warbler (*Ac. arundinaceus zarudnyi*), a large bird, and the Babylonian Reed Warbler (*Ac. babylonicus*) of a somewhat intermediate size. As the field observations refer to the Common and Great Reed Warblers and doubtless include our new species, little of certainty can be said about it. Cheesman obtained the type specimen on April 22nd, 1917, at Basra where he found it among date palms and pomegranate

trees, and says a Reed Warbler of sorts breeds at Basra. Pitman obtained three specimens at Lake Akkarkuf near Baghdad on August 25th where they were not uncommon. Logan Home and Tomlinson found it breeding in the marshes near Basra and sent to Jourdain eight clutches of eggs together with a breeding bird. This specimen is in the Tring Museum labelled *brunnescens*, which it certainly is not. Jourdain who received nests as well as eggs, describes (t. c. p. 14) the former as " comparatively small and slight about 3—3½ inches in depth and about the same in diameter, totally unlike the deep bulky edifices constructed by the Great and Clamorous Reed Warblers. The eggs, three or more (usually four) in number, are also smaller (av. 19·5×14·6mm., 23 measured) and are very variable in colouring, some closely approaching the type of *A. palustris* while others would almost pass for *A. scirpaceus*, and two sets have a pale bluish grey ground and irregular streaks, spots and blotches, chiefly at the large end, of varying depths of sepia and ochreous brown." One clutch was (*Ibis*, 1920, p. 310) erroneously described as unusual varieties of *brunnescens*.

Five specimens examined : ♂, Basra, 22-4-17 (P. Z. C. and R. E. C.) *type of species.*

L. Akkarkuf, 25-8-17 (three) (C. R. P.); Basra, 11-5-19 (L. Home) ex Tring Museum.

This species has the same shaped bill as *stentoreus*, though smaller ; but the wing formula is like that of *arundinaceus*, that is to say the second primary is a little shorter than the third (the longest) and reaches between the third and the fourth. The first primary is minute, 6 mm.,* *shorter* than the longest primary covert. The tail is less rounded than in *stentoreus* or *brunnescens*, the outer feathers being 5-8·5 mm. shorter than the centrals, instead of 14-16 mm., as in *brunnescens*. The third primary only is emarginate on the outer web, unlike *brunnescens* in which the third and fourth are both emarginate. The tail is shorter than in any known race of *arundinaceus* or *stentoreus*, markedly so.

The colour of the upper parts is more olivaceous green than in either of these, and the throat pure white without any obsolete streaks. Underwing and axillaries paler, almost white. The autumn specimens appear to be more rufescent than the spring ones but they are poor specimens.

Iris brown, bill horn colour, tongue bright yellow, legs and feet plumbeous.

Wing 78-83·5, tail 61·5-65, bill from base 19·5-22, tarsus 23·5-24 mm.

Nothing is known about the status of this bird or its habits and distribution ; further observations and specimens are greatly desired.

82. The Common Reed Warbler. Acrocephalus scirpaceus -(streperus auct).

(1) *Acrocephalus scirpaceus scirpaceus*, Herm. (Obs. Zool., p. 202, 1804—Alsace).

(2) *Acrocephalus scirpaceus macronyx*, Sev. (Turkest. Jevotn. Moskov., viii, 2, p. 128, 1873—Syr. Daria).

There are no observations practically regarding this bird. Cheesman saw it at Shush on May 2nd and Buxton noted several in a reed bed at Gurmat Ali on August 18th and obtained a specimen ; other specimens were obtained at Amara, April 3rd, Busra, April 22nd, L. Akkarkuf, August 22nd, and Suleimania, September 9th.

Probably it is a double passage migrant through Mesopotamia. It was obtained at Fao by Cumming on August 20th.

All these specimens undoubtedly belong to the European (typical race), a curious fact since Mesopotamian birds on the whole belong to the Eastern races. The Eastern form of the Reed Warbler (*macronyx*) inhabits the countries east of the Caspian, and Persia, and one would expect that it would have been this race

* By a slip, in the original description 6 mm. "longer" appears instead of " shorter."

which passes through Mesopotamia ; indeed Zarudny records it as a passage migrant and wintering in the Karun district.

(2) One obtained by Cheesman on board " S. S. Lawrence " off Fao on October 1st, 1920, belongs to this paler race.

83. Marsh Warbler. Acrocephalus palustris.

Acrocephalus palustris, Bechst. (Ornith. Taschenb., p. 186, 1803—Germany.)

Cumming obtained a specimen at Fao on March 18th, 1884, and he considered it to be a passage migrant in March and April, as does Zarudny. Witherby found it common in the Highlands of Persia. We have no further records of this species ; I have been unable to trace this Fao bird ; no example of *palustris* is registered from Fao in the British Museum.

84. Sedge Warbler. Acrocephalus schænobænus.

Acrocephalus schœnobœnus, L. (Syst. Nat. Ed., x., p. 184, 1758—S. Sweden).

There is little to record about this species and its status is quite uncertain. Cumming obtained one at Fao on May 1st and thought it was resident there and says he had often seen it in long grass near the mouth of the river. Cheesman obtained one in a lucerne field at Ahwaz on May 24th which is a somewhat late date for it to be migrating, but Buxton got one at Amara on May 15th and he had no reason to suppose it bred there, and thinks it is an uncommon spring and autumn migrant. Other specimens were obtained at Basra on May 17th and Sheik Saad on March 24th, while I found it not uncommon in standing wheat at Basra on March 19th. Further observations are required.

The specimens obtained differ in no way from European ones.

85. Olivaceous Tree Warbler. Hypolais pallida.

Hypolais pallida elœica, Linderm (Isis. 1843, p. 342—Greece).

This Warbler is a very common summer visitor to the plains and is recorded from many places from Tekrit down to Fao. The first arrive in the last days of March or early in April, and towards the end of the month they are breeding. It is an inhabitant of scrub and gardens and the nests are placed in various situations in suitable cover ; Buxton and Tomlinson record that rose bushes are frequently selected, the nest being two to three feet up ; Logan Home found nests high up in tall thistles, also in a mulberry ; while several observers noted nests high up in the tops of large willows. Evans, who found a nest in a citron bush, describes it as very small, thin walled and deep, made of white down of a species of grass. Eggs may be found by the middle of May. Tomlinson and Logan Home considered 3, rarely 4, eggs a full clutch ; others have noted 4 eggs while Cumming at Fao found nests with five and six eggs. By the end of June family parties are on the wing, though eggs just hatched are also recorded at that time ; the latest record of this bird is September 17th by which date most have gone.

Considerable confusion has arisen over this bird ; in the B. N. H. Society's pamphlet " *Notes on the Animals of Mesopotamia* " the records of this bird appear under *Scotocerca inquieta*, a bird which does not occur in our area. This mistake arose through Cumming being misled over his eggs and specimens, and in the Journal XXVI, p. 293, he altered the record to *Hypolais languida* which he had obtained at Fao and which he took to be the breeding bird. Jourdain did not entirely clear up matters when he said (t. c. p. 672-3) that he had examined the eggs and they were those of *Hypolais pallida* ! *H.p. elœica* is the only known breeding *Hypolais* in Mesopotamia.

Sixteen specimens examined : 7 ♂ ♂, Amara, 1-5-18 to 29-6-18, ♂, 17-9-18 (P. A. B.) ; 4, Sheik Saad, 30-3-17 to 23-4-17 ; Sera, 30-4-19 ; Busra, 22-4-17 ; Kazimain, 12-5-19 (P. Z. C. and R. E. C.) ; Busra, 1918 (Hobkirk).

These birds correspond well with Greek specimens ; they are greyer in tone on the upperparts, less brownish in colour, than the typical race from the Nile valley ; altogether a " colder " looking bird. Wings of males 65-68 mm. and the tip of the second primary is nearly always between that of the sixth and seventh. The newly hatched young, like those of other Warblers I have seen, are perfectly devoid of down.

One bird obtained at Fao by Cumming in November 1884 and recorded (*Ibis*, 1886) as *obsoleta* by Sharpe, is considered by Witherby (*Ibis*, 1903, p. 542) to be *pallida* (*p. elœica*). I was unable to find this specimen. Of *Hypolais rama* there is no certain record.

86. Upcher's Tree-Warbler. Hypolais languida.

Hypolais languida, Hempr. and Ehr.(Symb. Phys. fol. cc, 1833—Syria).

Two were obtained by Cumming at Fao on August 27th and 28th, presumably on passage, as this is a hill breeding species. They are in the British Museum. Recorded by Zarudny as a winter visitor and passage migrant in the Karun district in small numbers.

Three half fledged young from Fao registered in the British Museum as belonging to this species are in reality the young of *elœica*.

87. Barred Warbler. Sylvia nisoria.

Sylvia nisoria, Bechst. (Gem. Nat. Deutschl. 4, p. 580, 1795—Middle Germany).

The Barred Warbler is a passage migrant in small numbers but perhaps is commoner than our records indicate, as it is a very shy and skulking bird. Pitman noted a few at Feluja on spring passage from April 24th to 30th; and Cheesman obtained it at Baghdad on the 26th. Weigold records it at Urfa on the 25th and Cumming got one at Fao in May. The spring passage would appear to last but a short time. There are three records in autumn, Basra, September 8th (L. Home) ; Sheik Saad on 11th and Shaiba on the 25th (Cheesman).

Pitman noted that it made all use of any cover it could and Cheesman found it among cotton bushes.

Seven specimens examined : Feluja, 24-4-17, 30-4-17, 29-4-17 (C. R. P.); ♂, Sheik Saad, 11-9-17 ; Shaiba, 25-9-16 ; Baghdad, 26-4-19 (P. Z. C. and R. E. C.) ; Busra, 8-9-19 (L. Home), Wings 88-90 mm.

An eastern race has been described by Schalow as *merzbacheri* (Orn. Monat., 1907, p. 3) from Tian Shan ; it is said to have a longer wing and paler head and neck than the typical race. Now I have examined 16 adults from Europe and 16 adults from Central Asia (Afghanistan, E. Turkestan (twelve) including Tian Shan, Kashgar, Khargalik) and I cannot see the slightest difference between them. The wings of the European birds measured 83-92 mm. and those from Central Asia, 85-93 mm. The tone of grey on the head and neck varied in both series—some paler, some darker, in both areas, and it so happens the darkest of all was a Tian Shan bird ! *merzbacheri* is evidently not a good race and a pure synonym of *nisoria*.

It is worth noting that Zarudny records the Eastern Orphean Warbler nesting commonly in the Zagros ; he did not meet with it in Mesopotamia nor have we any records of it.

88. Garden Warbler. Sylvia simplex.

Sylvia simplex, Latham (Gen. Synop. Sup p. 1,p. 287, 1787—England).

A fairly common passage migrant whose times of passage appear to be late and to cover a long period. It arrives about the middle of April and is to be found up to the end of May while Buxton obtained one at Amara as late as June

12th. There is however no evidence of its breeding in our area. It returns about the first week in September and the last record is November 3rd. Zarudny says it occurs in winter, but of this we have no record.

Five specimens examined : ♂, Amara, 12-6-18, ♂, 3-9-18, ♀, 11-5-18 (P. A. B.); ♂, Qualet Saleh, 28-5-18 (P. Z. C. and R. E. C.); Adhaim, 3-11-17 (C. R. P.).

These appear to be perhaps a trifle greyer on the back than most specimens. Witherby also noted that one from Central Western Persia was rather paler and larger (wing 80). There are however many British ones as large as this. Johansen has described a pale race, *pallida* from Barnaul in W. Siberia and possibly this is a recognisable form, but until one can see a series thence it is impossible to say.

89. Blackcap. Sylvia atricapilla.

Sylvia atricapilla, L. (Syst. Nat. Ed. X, p. 187, 1758—Sweden).

This species also is a passage migrant and seems to be much commoner in spring than in autumn. A few arrive towards the end of March, earliest March 24th, but it is not common until the first week in April during which month a good many pass through, and the passage lasts till mid-May, the latest the 18th. There are but few autumn records ; Tomlinson noted it on autumn passage and Cumming records that it passes through in September and October, Logan Home saw it at Basra on September 26th. Zarudny says it is a winter visitor as well as a passage migrant.

Seven specimens examined : ♂, Amara, 12-5-18, 16-4-18 ; ♀, 21-4-18, 12-4-18, 17-4-18 (P. A. B.) ; ♂, Sheik Saad, 1-4-17 (P. Z. C. and R. E. C.) ; ♀, Basra, 18-5-18 (Venning).

These are not to be differentiated from West European birds.

90. Common Whitethroat. Sylvia communis.

Sylvia communis icterops, Ménétr. (Cat. Rais. Caucase, p. 34, 1832—Talysch).

The Common Whitethroat occurs in fair numbers on both passages ; first noted at Sheik Saad on April 7th when it was plentiful, individuals only halting a few hours ; the passage lasts throughout April and well into May, as Cheesman obtained it at the oasis of Shaiba on May 25th and at Ahwaz on the 22nd. It returns again at the end of August and during September ; last record 23rd.

Cheesman noted that males were in song at Baghdad on April 27th, but there is no evidence of this species breeding.

Eleven specimens examined : Amara, 18-9-18 ; ♂, 4-5-18, ♀, 15-5-18 (P. A. B.) ; ♂, Khazimain, 26-4-19, ♀, Shaiba, 25-5-17, 23-9-16, 8-9-16 ; Ahwaz, 22-5-17 (P. Z. C. and R. E. C.) ; Feluja, 8-5-17 (C. R. P.) ; Basra, 3-5-19 (L. Home). Suleimania, 4-9-19 (Ross).

All belong to the eastern race *icterops* with the back and rump greyer, and the paler rusty edgings to the wings.

91. Lesser Whitethroat. Sylvia curruca.

Sylvia curruca curruca, L. (Syst. Nat. Ed. x, p. 184, 1758—Sweden).

Another common migrant on both passages, arriving rather earlier than the Common Whitethroat, and is widely distributed. First noted March 19th at Basra, it mostly arrives from the first week in April onwards up till the first week in May. Cumming records one at Fao on August 16th, but the main passage appears to last from the middle of September to mid-October. Zarudny says it is a winter visitor as well as a passage migrant. I can only remark that in this as in many other cases Zarudny's records are totally at variance with ours.

Twelve specimens examined : Amara, 16-4-18, 5-4-18, 25-10-17. ♀, 3 4-18, 29-9-18 (three). ♂, 17-10-18 (P. A. B.); Feluja, 2-5-17 (C. R. P.) ; Shaiba, 23-9-16 ; Sheik Saad, 23-3-17 (P. Z. C. and R. E. C.) ; Basra, 18-9-19.

All these belong to the typical race and I have seen no specimens of the eastern race *affinis* from Mesopotamia, but Sharpe identified one from Bushire as belonging to this form.

92. Hume's Lesser Whitethroat. Sylvia althæa.

Sylvia althœa, Hume (Stray Feathers, 7, p. 60, 1878—Plains of India.)

Zarudny gives this as a winter visitor and passage migrant in small numbers in the Karun district and as a common breeding species in the Zagros. We have no skins or records of it. If Zarudny is correct this is a considerable extension of this bird's range westward.

93. Desert Warbler. Sylvia nana.

Sylvia nana nana, Hemp. and Ehr. (Symb. Phys. folio cc., 1833—Tor in Sinai).

Buxton met with this species at Kumait on November 13th, frequenting saline desert where there are scattered bushes of *Sueda* and *Lycium* and no other vegetation, and hardly any other birds. There are one or two other records which might belong to this species. Woosnam obtained it in the Shuteit R. on March 26th. Its exact status is not known.

Zarudny gives it as a common winter visitor in the Karun district and as breeding in the Zagros in small numbers.

94. Menetries' Warbler. Sylvia, mystacea.

Sylvia mystacea, Ménétr. (Cat. Rais. Caucas. p. 34, 1832—Saliane on R. Kur. Caucasus).

This species like several others is only absent from Mesopotamia during the coldest part of the winter ; it disappears about the middle of December and returns at the end of February and early part of March. Thus Buxton noted it at Amara up to December 15th and not again till February 20th, while on March 13th there was a sudden influx. Pitman records it as passing through Feluja April 14th—21st.

Probably it is only in favoured places that it can be found as late as December—as Pitman noticed that in the Adhaim area in November it was very much scarcer than in the previous month. It is a bird of gardens, cultivation, scrub, etc., and is particularly fond of tamarisk and acacia (*Prosopis*). I found it in the non-breeding season a shy and skulking bird, an adept at hiding in a bushy date palm and slipping out unseen on the far side, repeating the same performance in each bush it flew to.

It nests throughout our area in suitable localities at least as far north as Tekrit. The nest is situated in the sort of position chosen by the Common Whitethroat, in scrub, pomegranate, thistles, acacia, etc., and usually one to two feet from the ground. The nest is made of grass stems interwoven with " goose grass ", lined with finer grass stems, also horse hair ; it is a neat, though somewhat loosely constructed, deep cup. At Ahwaz it is stated to breed early in April, but in most places the end of the month would seem to be the more usual date for fresh eggs, while these have been taken as late as June 6th. Mr. Jourdain, who received a considerable number of clutches from our area, informs me that none exceeded four, and in some cases three seemed to be a full clutch, his earliest nest was found on April 9th. There is a considerable variation in coloring ; the average size of 40 eggs was 17·0—13·1 mm.

Twenty-nine specimens examined : Adhaim, 4-10-17, 3-11-17 (three), 15-11-17 (C. R. P.) ; Sheik Saad, 15-9-17, —21-3-17, 24-3-17 ; Shaiba, 23-9-16 (P. Z. C. and R.E. C.); ♂, Amara, 14-6-18, 24-4-18, 23-9-18 (two), 27-3-18, 16-4-18, 3-19, 1-11-17, ♀, 13-3-18; ♀, Kumait, 16-11-17, ♂, 28-2-18; ♀, Baghdad, 5-10-17; ♂, Gurmat

Ali, 18-9-19 ; Kut, 1-10-18. ♂, Baghdad, 13-9-17 ; Amara, 11-4-19 (two) (L Home) ; ♂ ♀, Basra, 18-3-18 : ♂, 19-3-18. (C. B. T.).

Few birds caused so much trouble in identification to observers as this little Warbler which was variously reported, besides under its correct name, as " Whitethroat," *S. melanocephala*, *S. momus* and " Subalpine Warbler " ! However of the last three there are no specimens in the collections and no good evidence that they occur and in two of the cases the specimens sent turned out to be *mystacea* !

The males of *mystacea* have the dark crown less well defined and not so black as in *momus*, a longer wing 60-63·5 mm. and the second primary is equal to the sixth or seventh or more often between these two, whereas in *momus* it is between the seventh and eighth ; moreover *mystacea* has the breast vinous pink, varying in amount, so that in worn birds but a faint tint shews. The females (besides the wing differences) are much less warm brown above than female *momus* and not so pure white below (the flanks especially being tinged with vinous buff). The adult male in winter is like the spring male and some even more vinous on the breast (? older birds), but the upperparts have brown edgings to the feathers ; the young birds in first winter plumage in both sexes much resemble the female, the males apparently having no strong vinous wash.

Legs pale brown to flesh yellow ; bill steel grey. Iris yellow brown, orbicular dull brick colour in male, pale buff in female.

Zarudny says *Sylvia momus semenovi* winters commonly in the Karun district and breeds in numbers in the Zagros ! I do not know this bird of Zarudny's and if common it is curious that no one obtained any, but his description sounds very like the first winter *mystacea* except that his measurements run smaller, *viz.*, 51-61 mm.

Mr. Jourdain (*Ibis*, 1920, p. 310) has recorded eggs of *S. momus* from Mesopotamia ; as recorded above many have mixed Mènètriès' Warbler up with other species, and there is no definite evidence so far that *S. momus* occurs at all.

95. Eastern Rufous Warbler or Grey Backed Warbler. Agrobates galactotes. "Humurra."

(1) *Agrobates galactotes familiaris*, Mènètr. (Cat. Rais. Cauc., p. 32, 1832—Kur, S. Caucasus).

(2) *Agrobates galactotes syriaca*, Hemp. and Ebr. (Symb. Phys. fol. b. b., 1833—Beirut in Syria).

This species is a very common summer visitor to Mesopotamia and must be familiar to the least observant. It arrives at the end of April and early May, the earliest date recorded being April 17th, and though some leave as early as the end of August, most depart again during September or early in October. It is a common garden bird and occurs in suitable places throughout the country. It starts to breed soon after arrival,—as early as the end of April according to Tomsilnon, but most nests may be looked for about the middle of May, while eggs are recorded in June and July, so that probably it is double brooded. The site often chosen is a young palm three or four feet up, or in rubbish against the trunk of a large palm, but also fairly close to the ground, in or under bushes, in walls or sides of irrigation canals ; the eggs are four, often five, in number and vary very much in type. The nest is a fairly solid structure made of grass, etc., and pieces of snake skin are recorded as being utilized in the lining, as well as hair and jute string.

This familiar little bird is said to be a beautiful whistler ; Magrath writes of it " it was quite delightful the way it utilized the ropes of one's tent as a perch from which to utter its pretty little song, often darting into the tent to take an insect from the floor between the performances ; as an accompaniment to the song the tail is flirted, expanded and elevated sometimes almost touching the back of the head ". Fourteen specimens examined (April to September) very

somewhat *inter se*, but all must be attributable to this form except one, which is quite inseparable from *syriaca*. This was obtained by Pitman at Feluja on April 24th where typical *familiaris* also occurs and breeds. Pitman records that many Rufous Warblers passed through Feluja for elsewhere and possibly this bird was also *en route* for further west. Weigold says the Euphrates is the dividing line between these two races, *familiaris* to the East, *syriaca* to the west, but of course he here alludes to the Upper Euphrates which runs roughly north and south through the district he was in, Urfa, where he obtained *familiaris*; at Bab in Syria not very far from Urfa he obtained *syriaca*. Zarudny records *syriaca* from the Karun district as a very rare vagrant.

The juvenile plumage of this species resembles the adult, but has broad pale edges to the tertials and wing coverts.

Zarudny described *A. familiaris persica* (J. F. O. 1911, p. 238) from the Karun district, Zagros and Beluchistan. The collections do not contain any specimens from the Karun ; those from Basra appear to be typical *familiaris*.

96. Streaked Wren-Warbler. Prinia gracilis. "Abu Zar," "Zeater."

Prinia gracilis lepida, Blyth. (J. A. S. B. 13, p. 376, 1844—Indus Territories).

This Wren-Warbler is common and resident throughout our region from Daur to Fao and Shustar. It is not recorded however from Urfa by Weigold or from Mosul. In winter it is not nearly so conspicuous, keeping to thick cover especially Acacia jungle (*Prosopis*), corn and reeds. In summer, according to Pitman, it spreads out more or performs local migrations, and is then seen in places where in winter it was not to be found. Besides frequenting reedy ditches it is to be found, according to Buxton, far out in large reed beds half a mile from land, where he came across it on February 23rd near Ezra's Tomb, and again on April 21st, so that in this somewhat unusual habitat it probably nests also.

It breeds throughout its range ; Cumming gives the nesting season as April to June but the latter half of May appears to be the usual time for first nests with eggs ; many nests were reported from this date to July and Buxton found fledglings on September 20th so that probably two or more broods are reared. Almost any thick cover, bushes of acacia and tamarisk, thistles, etc., are utilized for the nest. Cheesman, who found a nest five feet up in a tamarisk, describes it as egg shaped with a large opening in the side, made of fine grasses interwoven with thistle down and spider's cocoons and lined with thistle down. Logan Home notes that the birds add to the nest after laying, and reports finding a nest of *Cisticola* appropriated by a pair of this species which had built on a dome to it. The full clutch is four or five, sometimes three, and Cumming has found a nest with six eggs.

The usual coloration of the eggs is a pale greenish ground, spotted thickly or thinly with red-brown.

The song, which may be heard as early as the middle of February, though usually not till some weeks later, is described by Cheesman as being like a grasshopper's note followed by a bubbling or bursting sound. The Arabs are well acquainted with this bird which in the south they call " Abu Zar " (but at Baghdad Cheesman says it is called " Zeater "). Abu Zar means " Father of nakedness ", no doubt in reference to its scanty feathering. The Arabs say " it is the *sheik* of all birds, because though so tiny yet his beak is so sharp that he can sit on the head of any bird and pick out its brains." It would be interesting to know how this legend arose ; I give it as it was given to Buxton by the Arabs on the Hawazie swamp.

Twenty specimens examined : Shustar, 20-1-18 (F. M. B.); Shaiba, 30-9-16 ; Khazimain, 6-4-19, 10-5-19, 11-5-19 ; Busra 18-2-18 (P. Z. C. and R. E. C.) ;

Amara, 3-11-17) (two), 11-2-18, 5-4-18, 18-9-18, ♀, 4-2-18 ; Baghdad, 25-9-17, ♀, 22-3-18 ; ♀, Amara, 6-6-18 ; ♀, Gurmat Ali, 18-8-18 (P. A. B.) ; Adhaim, 13-11-17 (C. R. P.) ; Akuba, Euphrates, 9-4-18, ♀, 9-4-18 (Venning) ; ♀, Basra, 17-3-18, 18-3-18 (C. B.T.).

This series is not in very good order, the skins are not good ones, some were juveniles, others in moult. They are so near to *lepida* that I cannot separate them, they vary rather, some seem a trifle greyer, others darker ; *lepida* from India also varies. Pattern of the tail as in *lepida*. I was at first very surprised that the *Prinia* should be the same as the Indian one, but on consideration perhaps it is not so remarkable, as the range extends probably continuously along South Persia into Beluchistan and Sind.

The Scrub Warbler (*Scotocerca inquiteta*) crept into Cumming's list of Fao birds and into the Bombay N. H. Society's pamphlet through a mistake as explained under *Hypolais p. elœica*. It does not occur so far as we know ; it is of course a " hill " bird.

97. Fan-tailed Warbler. Cisticola cisticola.

Cisticola cisticola, subsp, ?

In the lower part of Mesopotamia, at all events, this Warbler is found as a resident in small numbers and somewhat locally. The only places it is recorded from are Sheik Saad, Amara and Basra ; possibly it was overlooked by others elsewhere, or recorded as some other Warbler. Buxton found it not so uncommon at Amara but local, and he noted that it particularly frequented the edges of vegetable gardens where the cultivated parts were being invaded by desert scrub, such as *Prosopis*. Logan Home found it fairly common in suitable places near Basra. On June 12th he found two pairs building in green grass over water or wet ground ; the nests were then half built. Owing to continual cutting of the grass it was not till the end of July that he found a completed nest,—one with young on the 20th, and one with three eggs on the 27th, while nests with young were found as late as August 17th. The nests, well concealed and of the usual purse shape with the opening at the top, were composed of spider's webs and plant down and lined at the bottom with Bull-rush down. The peculiar jerky upward flight in the neighbourhood of the nest and the distinctive note will be familiar to those who have been in India.

Five skins examined : Sheik Saad, 14-12-16 (P. Z. C. and R. E. C.) ; Amara, 16-12-17, 30-12-17 (P. A. B.) ; Amara, 17-4-19 (tail lost) ; Basra, 14-8-19 (very worn) (L. Home.)

It is unfortunate that so poor a series of this bird was obtained, three fair winter specimens and two bad summer ones. The winter birds have fairly broad white tips to the tails and I cannot see much difference between these and the Indian *cursitans* ; however on such a series it would be premature to come to any definite conclusion as to what race inhabits Mesopotamia.

It is curious and significant that no *Cisticola* was found in Persia or Beluchistan by Zarudny, Blanford, etc.

98. Mesopotamian Babbler. Crateropus altirostris.

Crateropus altirostris, Hart. (Vög. Pal. F., p. 623—Fao).

This Babbler, which is peculiar to Mesopotamia, appears to be rather patchy in its distribution. At Fao where Cumming got the first known specimens (recorded as *huttoni*, Ibis, 1886, p. 484) he records it as plentiful. In the palm groves and cultivation round Basra I found it rather common ; it is reported as very common at Nasariyeh, but quite rare at Amara itself and Kut. But in the gigantic reed beds near Amara and Nahr Umar, it is common, the birds inhabiting reeds growing in water as much as a mile from land ! From Kut to Baghdad and thence to Tekrit on the Tigris, and from Nasariyeh to Feluja on the Euphrates, which includes several districts well worked by various observers, there

are no records; however Buxton met with it again at Khanikin on the Diala river on the Persian (Khurdistan) frontier! Zarudny records it as resident in the Karun district and also in the Zagros.

This Babbler is of course resident and breeds. Cumming says at Fao it nests from April to mid-June and he has found eggs as late as June 19th when many young were on the wing, so that probably this, like other species, rears more than one brood. Cumming gives the usual clutch as three eggs, Tomlinson, who records it from Basra and Ahwaz, says five eggs, but it is not certain that all his records refer to this species; in fact Jourdain informs me the larger clutches he received from Tomlinson were those of *huttoni*. The eggs are glossy blue and measure 20-21·5 by 16·5 mm.

Its habits, except for its propensity for reed beds, do not appear to differ from those of others of the genus, it may be recognized at once in the field by each member of the flock fluttering out of a bush one after the other and sailing to the bottom of the next bush. Hartert makes a mistake in putting this Babbler as a race of the Indian bird, as the larger Babbler *huttoni*, which *is* clearly a race of the Indian bird, occurs in the same area. It should stand as a separate species. Its smaller size, more curved and weaker bill and almost spotless upperparts at once distinguish it from *huttoni*!

Twenty specimens examined: ♂, Basra, 18-2-18; ♀, Amara, 30-1-18; Fao, 8-7-17; Amara, 18-10-16, 12-8-18, 14-2-18, (P. Z. C. and R. E. C.); ♀, Amara, 18-10-18; ♀, Basra, 15-8-18; Amara, 9-1-18; ♂, Ezra's Tomb, 23-2-18; Khanikin, 23-11-18 (two pairs) (P. A. B.); Nahr Umar, 24–3–18 (C. R. P.); Amara, 7-3-19 (?); ♀, Basra, 21-11-17 (two); ♂ ♀, 19-3-18 (C. B. T.).

The juvenile plumage is very different to that of *huttoni*. Upperparts pale sandy grey with fine dark shafts to crown and back; chin and vent white, rest of underparts creamy buff and unstreaked; ear coverts creamy buff.

Wings 74-80 mm.; tail 102-107 mm. Bill from base 20·5-24 mm. Wing formula 4 and 5 longest, 3=8.

99. Hutton's Babbler. Crateropus caudatus.

Crateropus caudatus huttoni, Blyth. (J. A. S. B. xvi., p. 476, 1847—Kandahar).

This larger Babbler would appear to have a restricted range in Mesopotamia. Its headquarters are in and around Baghdad where it is not uncommon, inhabiting date palm gardens. Cheesman met with it at Zoar on the Tigris in jungle and again at Nahr Umar, and at Khanikin on the Diala river. In both these latter places *altirostris* also occurs; Woosnam obtained it at Bund-i-kir and Zarudny records it from the Zagros. It is resident where it occurs; Cheesman, who found a nest of three fresh eggs at Khazimain on April 13th, says the nest was placed in the heart of a young date bush well concealed by tall thistles and rank herbage growing up into the bush. The nest, loosely constructed but firm, was an open thin walled cup, the foundations made of grass and corn stalks with a few dry roots and grass stems interwoven with date palm fibre and lined with finer fibre. The eggs measure 23·5 by 19 mm. They are not so deep in colour as those of *altirostris* and four is the more usual clutch, even five.

In habits it seems to resemble the Indian race, the call note is a tremulous twitter, occasionally a scale of falling notes; food consists of *coleoptera* and small white seeds.

Thirteen specimens examined and compared with type and series of topotypes: ♂, Abed, 9-2-18 (F. M. B.). ♂ ♀, Azizieh, 16-10-18; ♂ Baghdad, 13-11-18 (two); ♀, Baghdad, 9-2-19; ♂ ♀, 14-2-19; Baghdad, 10-11-17, 15-2-19; ♀, Nahr Umar, 17-2-18 (P. Z. C. and R. E. C.), ♂ ♀, Baghdad, 10-10-17 (P. A. B.).

I thought at first that Mesopotamian birds were separable from typical ones from Khandahar having darker and greyer upperparts with rather heavier

markings and greyer less fulvous underparts, but I found that several individual birds from Mesopotamia were quite inseparable from Khandahar birds and that the characters I relied on were variable in birds from both localities and I think in part was due to the make of the skins. Wings, ♂ 88-94, ♀ 85-87. Tail 116-130 mm.

The juvenile plumage of *huttoni* is quite different to that of *altirostris*; it is heavily streaked above especially on the head where the dark markings take up most of feather and, with the pale edges to the feathers, gives it a spangled appearance; in this plumage it is very similar to that of typical *caudatus*.

100. Song Thrush. Turdus philomelos (=musicus auct.)

Turdus philomelos philomelos, Brehm. (Naturg. Vög. Deutschl, p. 382, 1831—Central Germany).

This is a winter visitor, widely distributed and commoner than the Blackbird. To a certain extent it is also a weather migrant. The time of arrival is about mid-November and some depart again early in March and most have gone by the end of the month. Weigold records one at Urfa on April 19th. A shy retiring bird it is met with mostly singly, affecting scrub, date gardens, etc. Buxton noted that it suddenly became quite common on December 11th, 1917, at Amara during a sudden cold snap and strong north winds and it remained common up to the end of February.

Eight skins examined: Shustar. 31-1-18, 1-1-19 (F. M. B.); Samarra, 8-3-18, 6-3-18, 5-3-18 (C. R. P.); ♂, Qalet Saleh, 25-11-17 (P. Z. C. and R. E. C.); Sulemania, 12-11-19 (Ross); ♂, Basra, 18-3-18 (C. B. T.). All are of the typical race.

101. Blackbird. Turdus merula.

(1) *Turdus merula syriaca*, H. and E. (Symb. Phys. Aves. folio. b.b. 1828—Syria).

(2) *Turdus merula intermedia*, Richm. (Proc. U. S. Nat. Mus., xviii, 1895, p. 585, 1896,—Aksu E. Turkestan).

The records are too few to say much about the Blackbird beyond stating that it is apparently a rather scarce, though widely distributed, winter visitor. The first record relates to December 2nd and there are records each month to March 19th throughout the length of the country from Mosul to Fao.

Sassi records the typical race from Mosul in January; Witherby identified one obtained by Woosnam at Shush on March 18th as *syriacus* (Ibis, 1907, p. 83) and Zarudny says this latter race nests and winters in the Zagros in small numbers.

(i) ♀, Baghdad, 12-17. W. 122, T. 110. Bill base 25 mm.

(ii) ♀, Amara, 6-2-18. W. 136. T. 123. B. 27 mm. (P. Z. C. and R. E. C.); ♂, Baghdad, 5-12-17. W. 137, T. 121·5. B. 27 mm. (Ingoldby).

The Baghdad bird is clearly *syriaca*; the other two are too large for this race and correspond well with *intermedia* from Turkestan. Over these determinations Dr. Hartert, who kindly examined these specimens, agrees with me. Woosnam's bird, above referred to, and one obtained at Fao by Cumming are equally large and must also be referred to *intermedia*. *Syriaca* however *does* occur in S. W. Persia whence I have seen one in Witherby's collection.

102. Black-throated Thrush. Turdus ruficollis.

Turdus ruficollis atrogularis, Temm. (Man. d'ornith, 1, p. 169, 1820—Austria).

Pitman saw two males of this Thrush feeding on berries in scrub near Amara on January 30th, 1916. Tomlinson met with it at Basra on March 5th, 1911, and Zarudny lists it as a winter visitor in small numbers for his area.

Possibly a weather migrant as in many other places.

103. Rock Thrush. Monticola saxatilis.

Monticola saxatilis, L. (Syst. Nat. Ed. 12, p. 294, 1766—Helvetia).

A passage migrant, not common; noted by Tomlinson at Basra on March 30th; in April at Samarra and Gurmat Ali on April 29th by Logan Home. Armstrong found it common at Fao on April 28th and Buxton got a single one at Amara on May 12th. It would appear to be commoner at Fao than elsewhere as Cumming notes it passing through in March and April; Zarudny records it as a winter visitor and passage migrant. We have no records in winter.

104. Blue Rock Thrush. Monticola solitarius.

Monticola solitarius transcaspicus, Hart. (Bull B. O. C., 23, p. 43, January 1909—Tedjen, Transcaspia).

Naturally a scarce bird, probably it is more or less resident in the hills, wandering to the plains in small numbers in winter, as in other parts. Logan Home saw it in the cliffs at Tekrit, and Aldworth says it breeds there. Cheesman got a male at Mosul on December 12th. Zarudny says it breeds in the Karun district, doubtless in hilly parts round Ahwaz and Bund-i-kir where Woosnam got it on March 5th.

This is a paler form with rather a shorter wing than the European bird. I am in doubt as to which race the Mosul bird belongs but as Hartert says he has seen this race from Fao I leave it provisionally under this name. Blue Rock Thrushes from Mesopotamia, especially breeding birds, are *desiderata*.

105. Common Wheatear. Ænanthe ænanthe.

Ænanthe œnanthe œnanthe, L. (Syst. Nat. Ed., x, p. 186, 1758—Sweden).

The Common Wheatear is mostly a passage migrant through Mesopotamia. The first arrive about the second week in March and from the end of March onwards to mid-April it is plentiful while it is not until about the middle of May that all have passed on again. The return passage commences about mid-August and this species is again plentiful during September and well on into October. It appears that a few, here and there, remain during the winter. Pitman records it from Samarra during the winter months as does Logan Home at Tekrit; Pitman also noted a few at Kut, Kurna and Sheik Saad in January, etc.

Twenty-eight specimens were obtained all in March and April, and September and October except the following: Suleimania, 15-11-19 (Ross); Shat-al-Adhaim, 3-11-17; Bait-al-Khalifa, 11-1-18; Kut, 10-1-18 (C. R. P.).

I refer all these for the present to the typical race; besides these I have examined a good many others from the east and I can see amongst them ones with longer bills (*rostrata*, H. and E.) and ones with paler mantles (*argentea*, Lonnb). In this latter form the pale mantle is not always associated, as Lonnberg says, with a broader white forehead; in the case of *rostrata* so many specimens are intermediate in size of bill between this and the typical race that it is impossible to draw a line, the intergradation is too great. Until one can see a good series of these two supposed races from their breeding grounds, it seems best not to recognize them as distinct. What however is noticeable about these Mesopotamian specimens is that they tend to run longer on the whole in length of wing:—Fourteen males measure 97-100·5, once 102 mm.; some western European birds run up to 100 mm., but among these Mesopotamian males there are none of wing length of 94-96 mm. such as often is found among the former. The great majority of our specimens are no paler on the mantle than the typical race. The bills measure 17 to 19 mm. mostly 18 mm.

106. Desert Wheatear. Ænanthe deserti.

Ænanthe deserti albifrons, Brandt. (Bull. Acad. St. Petersb., 2, 1844, p. 139—W. Siberia).

The Desert Wheatear as a winter visitor is widely distributed in small numbers, but is nowhere very common except when it first arrives, and then in favoured places a fair number may be seen, as on the Adhaim, where Pitman found it not very uncommon at the end of September and first part of October; either they spread out afterwards to other places or some pass right through the country, as in winter scattered examples are the rule. It first arrives early in September and the last record we have is the first week of March. It is partial to the vicinity of scrub and cover, as well as to nullahs and desert, and frequently settles on small bushes.

Zarudny says it nests in small numbers in Mesopotamia; he does not specify where but presumably in the hills near Ahwaz, perhaps beyond our area. He lists the race *montana* as a rare winter visitor.

Twelve skins examined: ♂, Baghdad, 17-9-17 (P. A. B.); Legait 2-3-18; ♂, Beled, 22-2-17 (P. Z. C. and R. E. C.); ♂, Ahwaz, 10-1-19 (Armstrong); ♂ ♀, Adhaim, 14-11-17, ♂, 29-9-17, 23-9-17, 17-10-17, 14-10-17, 20-10-17; ♂, Kut, 20-2-17 (C. R. P.).

These are typical *albifrons* with wings of males 91-95 mm.; none shew the large amount of white in the wing which *montana* has.

107. Black-eared Wheatear. Ænanthe hispanica.

Ænanthe hispanica melanoleuca, Güld, (Nov. Com. Petrop., 19, p. 468, 1775—Georgia).

This is a spring and autumn passage migrant through Mesopotamia from the middle of September to mid-October, and again at the end of March and in April. It appears to be widely distributed but not very common. Weigold found it common at Urfa from April 11th to 23rd frequenting stony ridges and the males were singing. Zarudny records this bird, under the name *amphileuca*, as a passage migrant and also his race *gaddi*; this latter I have seen no specimens of, and his description of it sounds to me like that of an individual variation, especially as he records in other districts of Persia hybrids between *gaddi* and *amphileuca* and between *gaddi* and *melanoleuca*!

He says both the black-eared and black-throated forms breed commonly in the Zagros, the latter is there a migrant, the former being found but rarely in winter. *Melanoleuca* certainly breeds no further off than Kasr-i-Sherin and Pa-i-taq (Buxton).

Six specimens examined: ♂, Amara, 16-10-18 (black-throat); Baghdad, 10-10-17; (white-throat); ♂, 15-9-17 (P. A. B.), ♀, Feluja, 23-3-17 (black-throat), 23-3-17 (white-throat); ♀, Shat-al-Adhaim, 29-9-17 (black-throat) (C. R. P.).

I have followed the latest fashion in uniting black-throated and black-eared (=white-throated) specimens of this Wheatear, as the concensus of opinion seems to be that they are dimorphisms of one species and I have no proof to offer one way or another. Until some one makes a special study of these birds in their breeding quarters to ascertain whether the two forms interbreed, either by obtaining black-throated females paired with white-throated males, or by rearing nests of young ones, this much debated point will never be satisfactorily settled. It could easily be done by any one who has the opportunity. There is this to be said for uniting them that it must be very rare to find two otherwise similar species always more or less migrating together and breeding in the same areas; on the other hand if they freely interbreed one would expect hybrids between the two to be commoner than they are; their habits, etc., seem to be similar.

108. Pied Wheatear. Ænanthe pleschanka.

Ænanthe pleschanka pleschanka, Lepech (Nov. Comm. Petr., 14, p. 503, 1770—Saratov on the Volga).

A passage migrant in small numbers and widely distributed, passing through in March (earliest March 1st) and again at the end of September and during October, in which month it is more plentiful than at other times. Tomlinson says it is not uncommon at Basra on both passages and Cumming obtained it at Fao in April and October. Cheesman notes that it flies straight up in the air in pursuit of flies, but I do not think that this habit is confined to this species entirely. It may be commoner than our certain records indicate but some observers confused this with the former and the next species. Zarudny lists it as a passage migrant and also the white-throated variety (*vittata*).

Nine specimens examined: ♂, Legait, 1-3-18; ♂, Shaiba, 4-10-16; Sheik Saad, 29-3-17 (P. Z. C. and R. E. C.); Adhaim, 30-9-17, ♂, 14-10-17 (two), ♂, 20-10-17, 17-10-17 (C. R. P.); ♀, Basra, 1918 (Hobkirk).

109. Barne's Wheatear. Ænanthe finschii.

Ænanthe finschii barnesi, Oates (Faun. B. India 2, p. 75, 1880—Baluchistan).

This fine black and white Wheatear is a winter visitor, apparently much commoner in the area above Baghdad on the Tigris, where stony ground, cliffs and nullahs occur, and in the foothills, than in the alluvial plain below Baghdad whence there are few records. The earliest record is October 20th and the latest March 1st. It is rather a wary bird, found singly or in pairs, frequenting bare nullahs, cliffs, ruins, and desert mounds.

It certainly breeds, according to Cheesman, in the Pa-i-taq mountains on the Kasr-i-Sherin-Kermanshah road and may possibly do so in the neighbourhood of the former place. Zarudny records *finschii* and *finschii turanica* as winter visitors to the Karun district. I take both of these to be synonyms of this bird.

Thirteen specimens examined: ♂, Kumait, 28-2-18 (P. A. B.); ♂, Kazimain, 13-2-19; Beled 1-3-19, ♀, 22-2-19 (P. Z. C. and R. E. C.); ♂, Adhaim, 13-11-17, 20-10-17 (two), 22-10-17, 14-11-17; ♂, Beit-al-Khalifa, 11-1-18, 30-1-18 (two); Samarra, 6-2-18 (C. R. P.).

I consider all these to be the race now known as *barnesi*: wings of males 90-93, ♀ 89 mm. The females all have grey throats. This is one of those cases where great confusion will be caused by the changing round of names. This species was always called *finschii* and the more eastern race of it *barnesi*. Hartert in his Vög. Pal. Fauna, p. 690, changed the specific name to *melanoleuca* of Guldenstadt, a name which had always (falsely according to him!) been used for the Eastern Black-eared Wheatear. The name *finschii* has now been reinstated and *melanoleuca* goes back once more to its original owner. The net result of this is that, in the period between these changes and probably for some years to come, records under *melanoleuca*, unless very carefully given, will be open to doubt as to which Wheatear is referred to!

110. Isabelline Wheatear. Ænanthe isabellina.

Ænanthe isabellina, Cretzschm (Atlas zu Ruppell's Reise. Vögel, p. 52, 1826—Nubia).

The status of this species is not quite clear; probably a few are resident and their numbers are augmented by winter visitors. Cumming says it is a winter visitor at Fao remaining till well on into spring and an occasional one is to be met with in summer. Buxton saw one near Amara on July 13th and obtained one on the 25th, so probably a few remain out in the salt desert to breed. Zarudny too says it breeds in small numbers in the Karun district; on the Syrian boundary it certainly breeds, as Weigold records that he shot a breeding female in April on the steppes between Urfa and Aleppo.

This species is rather more of a bare desert bird than the other wheatears even, and Buxton noted its partiality for salt desert with scanty vegetation of scattered bushes of *Sueda* and *Lycium*,—the sort of country where it and *Sylvia nana* reign supreme! Here it is not uncommon; elsewhere, though met with, it is somewhat local and few in number. Pitman saw two chasing each other, and the male singing well, on January 29th at Samarra.

Six specimens examined; Beled, 22-2-19 (P. Z. C. and R. E. C.); Kut, 25-7-18 (P. A. B.); ♂, Basra, 27-2-18 (Armstrong); Suleimania, 5-9-19 (Ross); Kut, 4-1-17, Samarra, 7-2-18 (C. R. P.).

111. Red-tailed Wheatear. Ænanthe xanthoprymna.

(1) *Ænanthe xanthoprymna xanthoprymna.* Hemp and Erh. (Symb. Phys. fol. dd., 1833—Nubia).

(2) *Ænanthe xanthoprymna cummingi*, Whit. (Bull. B. O. C. x, p. 17 1899—Fao).

(3) *Ænanthe xanthoprymna chrysopygia* (de Fil) (Arch. Zool. Genova ii., p., 381. 1863—Demavend in N. Persia).

It is unfortunate that we have no records or specimens of any form of this Wheatear and so can add nothing to what has already been recorded, but I will give a short *resumé* of the three races in order that future workers who are fortunately placed may know what is wanted.

(i) This, the first described form, is a rare bird and has been found in what are evidently its winter quarters, or its passage route, in Nubia, Egypt, and the Red Sea Coast, and according to Zarudny it nests in the desolate hills which border the lower Karun on the east side.*

(ii) Cumming's Wheatear is a still rarer bird apparently; it was described from a specimen which Cumming obtained at Fao on passage; he gives it as passing in August and September and again in March and April. (Ibis, 1886, p. 483, where Sharpe erroneously called it *mœsta*). It has been found twice, in January and November in Berber Prov. Sudan, and twice in the Red Sea Prov. in March. Zarudny says it is common on passage on the heights of the Jebel Tnüe near Ahwaz.

Possibly these two birds are not so rare as they appear to be; one can well imagine that a species which breeds in such out-of-the-way places as hills in S. W. Persia, which presumably migrates across Arabia and winters perhaps in unfrequented parts of Africa and has not a wide distribution, might well for many years escape the eyes of ornithologists.

Zarudny says that, *according to the testimony of Arab hunters and shepherds, cummingi* nests in the same hills as *xanthoprymna*. If this is so, then it would seem almost certain that one is a dimorphic variety of the other, but this would certainly have to be founded on better proof than the statements of Arab shepherds!

(3) This is the best known of the three, it breeds in the Persian Highlands and is not at all uncommon in Beluchistan and N. W. India in winter. Zarudny lists it as a winter visitor and passage migrant in small numbers in the Karun area and thinks it may nest also. He considers this bird a species of itself and *cummingi* as a race of *xanthoprymna*; he may be right but one cannot really determine this until the status of all of these is better known, and so I have left them, as Hartert placed them, for the present.

Chrysopygia may always be known by its greyish underparts, isabelline grey upperparts and having red at the base of the tail; sexes similar. *Cummingi* male like *chrysopygia* but the head and throat black; *xanthoprymna* like *cummingi* but base of tail white; in the last two, sexes not alike. All three have *reddish* upper tail coverts.

* Since writing this, I have received from Cheesman an adult male of this race obtained close to Baghdad on September 23, 1920.

112. Mourning Wheatear. Ænanthe lugens.

Ænanthe lugens lugens, Licht (Verz. Doubl. Mus. Berlin, p. 33, 1823—Nubia).

Weigold states that a pair were seen and the female obtained at Bumbudj on the Euphrates on April 8th; this is hardly in our area, but I mention it as Zarudny says he obtained it at Dizful on March 12th and at Sia Manssur in the same area on March 8th. Its status requires further investigation. Hartert (Vog. Pal. F., p. 695) does not mention its occurrence further north or east than Palestine.

113. Persian Wheatear. Ænanthe persica.

Ænanthe persica, Seeb (Cat. B. Brit. Mus. V, p. 372, 1881—Shiraz).

Mentioned by Zarudny as a passage migrant in small numbers in the Karun area, and breeding in the Zagros.

114. Indian Pied Wheatear. Ænanthe picata.

Ænanthe picata, Blyth. (J. A. S. B. xvi., p. 131, 1847—between Sind and Ferozopore).

One was obtained by Bailey at Shustar on January 15th. Zarudny gives it as a passage migrant in small numbers. Probably it is a scarce winter visitor to the foot-hills in the Karun district only.

115. White-tailed Wheatear. Ænanthe leucopyga.

Ænanthe leucopyga, Brehm. (Vogelfang, p. 225, 1855—Assuan.)

Zarudny says he obtained one near Ahwaz on February 26th, 1904. This is a considerable extension of this bird's range north from S. Palestine and its status requires further investigation.

116. Hume's Wheatear. Ænanthe alboniger.

Ænanthe alboniger, Hume (Stray Feathers, i., p. 2, Nov. 1872—Hills of Sind).

Buxton obtained a single specimen on the Diala River near Shahroban on November 22nd, 1918. Zarudny gives it as a winter visitor in the Karun district. From my knowledge of it elsewhere I should say it must be resident where it occurs.

From the above list it will be seen that a very large number of kinds of Wheatears may be found in our area, and a good many of these are " black and white " birds, chiefly or exclusively to be found on or near hilly ground. Any one who gets a chance to be in suitable situations for them I would remind that their status is little known and that observations *without specimens* are well nigh useless, as in the field many are so alike. One or more species of black and white wheatear certainly nests in the Ahwaz district as Tomlinson found a nest on the Jebel Sanam on May 29th with fully fledged young.

117. Whinchat. Saxicola rubetra.

(i) *Saxicola rubetra rubetra,* L. (Syst. Nat. Ed. xi, p. 186, 1758—Sweden).

(ii) *Saxicola rubetra noskae,* Tsch. (Orn. Jahrb., 1902, p. 234—N. Caucasas).

(1) Zarudny lists the typical race as a rare winter visitor and passage migrant. As the Karun district is very far to the east of this bird's range, its occurrence requires further examination.

(2) This race, to which our specimens belong, is apparently a winter visitor in small numbers, which are added to during the times of migration, but even then is not very common. Cumming at Fao recorded it in November and May. Buxton records it at Amara on December 1st, early September, and late in February. Hingston noted it at Feluja on November 22nd—whence Pitman

obtained specimens on March 29th and April 14th in scrub near cultivation where small flocks were halting on passage. Other records relate to Samarra, March 15th, and Kut, January 29th and April 8th.

Weigold found Whinchats not uncommon at Urfa on passage, April 12th to 20th. He attributes most to this race, and one to the typical race from its very dark brown colour. Zarudny records it as rare.

Three skins examined: ♀ Feluja, 14-4-17, 29-3-17 (C. R. P.); ♂, Basra, 20-4-17 (P. Z. C. and R. E. C.).

118. Stonechat. Saxicola torquata.

(i) *Saxicola torquata rubicola* L. (Syst. Nat. Ed. xii, p. 328, 1766—France).

(ii) *Saxicola torquata maura*, Pall. (Reise Prov. Russ. Reichs. ii., p. 708, 1773—Ural).

These two forms were not as a rule distinguished in the field and as the status of each appears to be the same I include the two together.

The Stonechat is a winter visitor to the plains and foot hills throughout our area in fair numbers. As they are most plentiful during the periods of migration they also probably are passage migrants through the country. The first arrive early in September but they are not common till the end of the month; from then till mid-November they become fairly numerous. In December and January they become scarce and numbers begin to pick up again as migration commences at the end of February; plentiful in March they move off north towards the end of the month, and a few are left up to about the middle of April. Last record May 7th.

Except at times of passage the species is rather local though widely distributed, and though fairly common in some places it is not to be seen at all in others, doubtless being drawn to sheltered spots where food supply is abundant.

They frequent scrub, crops, gardens, etc., often in pairs. I am unable to find any distributional difference between the two races, both occur throughout our area and both together; *maura* would appear to be the commoner. The nearest breeding ground of the latter is near Shiraz and the Zagros.

(i) Seven skins examined:—♂, Amara, 25-10-17, 26-10-17, 1-12-17, 3-11-18, ♀, 23-11-17 (P. A. B.); ♀, Shustar, 3-2-18 (F. M. B.); ♀, Kazimain, 15-2-19.

All these are quite typical *rubicola*; they have no white at the base of the tail; in the males the upper tail coverts are spotted and in the females this part is brown. Wings: ♂, 65·5-67; ♀, 63 mm.

(ii) Nineteen specimens examined:—♂, Baghdad, 19-3-18 (two); Amara, 3-11-18, 13-2-18, 1-12-17, 7-4-18, 11-9-18; Kurna, 17-3-18; L. Akkarkuf, 12-10-17; ♀, Amara, 2-9-18, 11-9-18, 30-10-17, 13-1-18; Ezra's Tomb, 23-2-18; Baghdad, 19-3-18, 31-3-18 (P. A. B.): ♂, Basra, 19-3-18 (two), ♀, 19-3-18 (C. B. T.).

The white at the base of the tail of this race varies very much and is partly at all events due to age. The adult males have a large amount of white extending well beyond the coverts, and sometimes leaving only a broad tip of black, these I take to be the so-called *hemprichi*. Males of the year have the outer web of the outer tail feather dark and the dark band at the tip of the tail broader. In the females there is less white than in the young males even, and is often quite hidden by the upper tail coverts.

Males of *maura* are whiter on the belly than males of *rubicola*; in both sexes the upperparts are markedly paler and the upper tail coverts are immaculate white, tinged with rusty brown in winter. The females of *maura* are paler below than the females of *rubicola*. A few females are practically indistinguishable from females of *indica*, having little or no white at the base of the tail, however in absence of any males of *indica* in our area I do not include this race.

119. Pied Bush-Chat. Saxicola caprata.

Zarudny lists this as an accidental straggler to the Karun district. It presumably would belong to the race *rossorum* which occurs in Transcaspia and Persia, etc.

120. Common Redstart. Phœnicurus phœnicurus.

(1) *Phœnicurus phœnicurus phœnicurus*, L. (Syst. Nat. Ed. x., p. 187, 1758—Sweden).

(2) *Phœnicurus phœnicurus mesoleuca*, Hemp. and Erh. (Symb. Phys. fol. ee., 1832—Jedda in Arabia).

In dealing with the Redstarts I have largely to go by specimens obtained, as the notes are meagre and observers not only mixed these two races up but also certainly mixed the Common Redstart up with the eastern form of the Black Redstart (*phœnicuroides*). The males of *mesoleuca* are easily distinguishable in the field by the white edging to the secondaries from the common form; in all males of the Black Redstart the black comes further down on the breast; and in both sexes the sixth primary is emarginate which is not the case in the common Redstarts; the female Black Redstarts are on the whole darker than the female of the Common Redstarts, but are almost impossible to differentiate in the field.

(i) This race arrives during the first week of April, a few perhaps earlier, and its time of passage lasts the whole month. Pitman noted a big migration, through Feluja on April 18th and all had gone by the first week in May; males predominated as also noted by Weigold at Urfa, where during the second and third weeks of April this was one of the commonest birds. The return passage appears to be late, there is no record before the first week in October, they are then common up to mid-November. Possibly some over winter as Cumming records one on February 25th at Bushire and Zarudny gives it as a winter visitor; several observers thought they saw it in winter; the vast majority however appear to be passage migrants.

Nine skins examined: ♂, Amara, 3-4-18, 25-10-17; Kumait, 14-11-17 (P.A.B.); ♂, Kazimain, 9-4-19 (P. Z. C. and R. E. C.); ♂, Sulimania, 15-11-19 (Ross); Shat-al-Adhaim, 18-11-17, ♀, 22-10-17 (C. R. P.); ♀, Baghdad, 10-11-17; ♀, Basra, 24-4-18 (Venning).

(ii) Passage migrant, arriving in the middle of March; noted at Amara on 13th, Basra on 17th, where males were not uncommon, Shuteit R. 26th, Ahwaz, 30th. Pitman saw a few at the end of March and early April. Cumming says it occurs at Fao in April, May and June, and Zarudny gives it as a passage migrant and winter visitor to the Karun district. We have no winter records.

Specimens examined: ♂, Amara, 13-3-18 (P. A. B.); ♀, Basra, 17-3-18, 19-3-18 (C. B. T.).

121. Black Redstart. Phœnicurus ochruros.

(i) *Phœnicurus ochruros ochruros*, Gmel. (Reise d. Russland. iii, p. 101, 1774—Mountains of Persia).

(ii) *Phœnicurus ochruros phœnicuroides*, Moore (P. Z. S., London, xxii. p. 25, 1855—Northern India) (I restrict this to Shikarpore in Sind).

Both races of Black Redstart are common winter visitors to our area; they apparently arrive towards the end of October, perhaps earlier, and most leave the plains by the second week in March. They are usually found singly, inhabiting old ruins, ravines, trenches or open country and are more wary and shy than common Redstarts. It appears from the specimens obtained that the common Black Redstart from Mosul to below Baghdad is *ochruros* and there are no certain records of *phœnicuroides* in this area, whereas below Baghdad *ochruros* is scarce and there are plenty of specimens of *phœnicuroides* thence: both however occur at Shustar and Zarudny lists both in the Karun district

(1) Fourteen specimens examined: ♂, Shustar, 20-1-18, 15-1-18 (F. M B.), ♂. Khazimain, 9-2-19 (two) ♂, Mosul, 7-12-18 ; ♀, Sheik Saad, 3-3-17 (P. Z. C. and R. E. C.); ♂, Amara, 13-12-17 (P. A. B.); ♂, Samarra, 7-3-18. 13-12-17, ♂, 6-3-18, 18-1-18, 13-12-17 : ♂, Adhaim, 8-11-17 (C. R. P.) ; ♂, Sulimania, 14-11-19 (Ross).

In *ochruros* the black comes further down on the underparts than in *phœnicuroides*; the underwings black and the auxillaries dark grey tinged with orange; some of the above males are not quite typical in that the black comes further down than usual, in one the vent only is not black and in three others the belly and vent is dark grey tinged with rusty orange, however they agree better with *ochruros* than with *gibraltariensis* (*titys* auct.), as in this race there appears to be never any orange tinge on the axillaries and vent. In young males the upperparts are grey with brown edges and the black underparts, except the chin, are much hidden by grey and fulvous edges. The females are warmer brown above, less grey brown ; browner, less smoky grey below; more isabelline in axillaries and underwing, and rather smaller than females of *gibraltariensis*.

Wings ♂81-86, ♀77-83 mm.

(2) Eleven specimens examined: ♂, Amara, 13-1-18, 29-11-17, 10-1-18, 25-10-18, 25-10-17, ♀, 3-11-17, 29-11-17, 18-12-17, 21-1-18 (P. A. B.); ♂, Zoar, 4-2-19 (P. Z. C. and R. E. C.) : ♀, Shustar, 7-1-18 (F. M. B.).

These males are not so black on the back as specimens from the Punjab, also the wing formula seems to be often different. In Punjab birds the second primary equals the seventh or is between seventh and eighth in length; in these Mesopotamian specimens the second is often between the sixth and seventh, there also appears to be a slight difference in size of the bill. Possibly the Persian breeding bird is separable, but without a series of breeding birds from Persia and India it would be unwise to recognise it.

Zarudny gives *semenovi* as a winter visitor and *titys* as a passage migrant in the Karun district. The former bird I do not know and the latter, if it really occurs, is a very long way out of its range.

There is no evidence that *semirufa* occurs in our area.

122. Eversmann's Redstart. Phœnicurus erythronota.

Phœnicurus erythronota, Eversm. (Add. ad. Pall. Zoog. Ross. As. 2, p. 11, 1841—Altai).

This is another of the species which comes in winter into Mesopotamia from the far N. E. Buxton obtained one at Amara on December 31st, 1917, and saw a male there on March 11th, 1918. Zarudny lists it as a winter visitor. There is a specimen in the British Museum from Fao.

123. Nightingale. Luscinia megarhynchos.

Luscinia megarhynchos africana, Fisch. and Reichw. (J. F. O., 1884, p. 182—near Kilimandjaro, E. Africa).

Most of the records apparently refer to this Nightingale. It is almost certainly a summer visitor, arriving at the beginning of April; Cheesman obtained one at Sheik Saad on March 31st and heard it in song at Basra on April 23rd. Logan Home says there were many at Amara and thinks that they were breeding or about to breed in the orange groves there, where they were singing on May 10th, an observation which Buxton confirms. Cheesman notes that they were evidently breeding at Kazimain on May 15th where they had been singing for a fortnight, and he obtained a specimen.

Of the song he says it compares well with that of the English bird but has some slightly different notes. He heard it at Shush on May 2nd.

In the Urfa district Weigold records that the European Nightingale, *L. m. megarhynchos* arrived on April 12th and became common and was seen daily

in song till the 28th; he obtained a single specimen of *africana* in April 16th and one which he considered to be *golzii* but not typical, on the 17th; but from what he says about its size (W. 85) and coloration it seems doubtful if it really belongs to this race. Zarudny records *golzii* as a winter visitor to the Karun district.

The two specimens obtained by Cheesman certainly belong to the Persian race *africana* and not the paler Turkestan one, *golzii*. Further investigation is required in the status of this and concerning other races which are said to have occurred.

124. Thrush Nightingale. Luscinia luscinia.

Luscinia luscinia, L. (Syst. Nat. Ed. x., 1758—Sweden).

Pitman met with this species at Feluja during the spring migration, when from April 27th to 30th they were very plentiful in willow and other scrub, and very skulking; he obtained two. Cheesman obtained a single bird at the oasis of Shaiba on September 27th. There is no evidence that this species breeds in the country; probably it is a passage migrant. Weigold noted it as common in spring passage arriving April 16th at Urfa. Cumming at Fao regarded it as a winter visitor arriving in the autumn and staying till late in the spring; he obtained specimens in October, January and on May 8th. Zarudny records it in winter from the Karun district so apparently a few must even winter in Mesopotamia though the majority seem to pass through.

The three specimens examined are quite typical.

125. Blue-throat. Luscinia suecica.

1. *Luscinia suecica magna*, Zar. and Loudon. (Orn. Jahrb., 1904, p. 225—Bidesar in Arabistan).
2. *Luscinia suecica volgæ*, Kleinschm. (Falco. iii, p. 47, 1907—Sarpa, Lower Volga).

Several races of Blue-throat evidently inhabit Mesopotamia and from the field notes it is impossible to differentiate the status of each race.

The race which breeds in S. W. Persia (*magna*) is usually without a spot on the blue-throat or has a small white spot, but it is easily distinguished in the hand from other races by its superior size. Probably all observations under the White-spotted Blue-throat refer to this race. This race certainly arrives early in August, as one might expect from the nearness of its breeding haunts, and is common by mid-August. Cheesman obtained one at the oasis of Shaiba in the Syrio-Arabian desert on September 5th which suggests that it was a passage migrant as none winter there. Buxton saw a white-spotted bird at Amara on November 28th, the latest record of this form.

It becomes evidently common again at the end of March and several specimens were obtained in full breeding dress, the last on April 19th. Cumming under *cyaneculus* probably refers to this race which he says appears in March on spring migration at Fao, and is seen through April to mid-May in pairs.

There is no certain evidence that this race winters in Mesopotamia, some race however probably does so.

Pitman says that he met with several Blue-throats on February 19th near Kut, and Buxton found it common at Amara on December 4th, but thought all had gone by mid-December; Pitman however saw one near Amara on January 24th. Like some other species, *e.g.*, Swallow and Sand Martin, it is likely that most depart for the few colder weeks of mid-winter, odd stragglers remaining in some well sheltered spots.

Two birds obtained in November and December by Buxton I cannot separate, except that they are rather small, from the typical race (*L. s. suecica*) but quite possibly they are *volgæ*, to which race I certainly refer one obtained in March at Sheik Saad and possibly a female from Amara. Weigold obtained

a Blue-throat at Urfa on April 11th but is in doubt to which form it should be referred, as it was a female; Zarudny records *pallidogularis* as wintering in the Karun district as well as the typical race.

During their sojourn in the country Blue-throats may be found in any thick cover, scrub, wheat fields, and particularly thick reeds on the edges of swamps or damp ground. They are always rather skulky and shy.

The race *magna* is I think very distinct; the long wing ♂80-83·5, ♀78-79; the long tail (60-63) and bill 16·5-17 mm. distinguish it from other races but in addition the blue of the throat, which is intense deep blue with or without a small white spot (as also obtains in the European white-spotted, *cyanecula*) joins the red of the breast *without any limiting black line*, which all other forms have. The adult male in winter has the chin and throat above the blue, isabelline with moustachial streaks of blue; the first winter male has less blue and this part has wide pale edges; chin and throat creamy white, while black spots form the moustachial streaks.

Fourteen specimens examined:

L. s. magna, ♂Kut, 9-8-19; ♂Amara, 4-4-18; Baghdad, 31-3-18 (P. A. B.); ♂, Basra, 19-4-17; ♀, Shaiba, 5-9-16 (P. Z.C. and R.E. C.); ♂, Feluja, 28-3-17; ♂, Nahr Umar, 26-3-18; ♂, Akkarku, 22-8-18 (C. R. P.); ♂, Basra, 21-8-19; ♀,Basra, 148-19 (L. Home). ? *L. s suecica* ♂♂Amara, 29-11-17, ♂13-12-17 (P. A. B.). *L. s. volgæ* ♂, Amara, 20-3-19, ♂, Sheik Saad, 20-3-17 (P. Z. C. and R. E. C.).

126. Robin. Erithacus rubecula.

(1) *Erithacus rubecula hyrcanus*, Blanf. (Ibis., 1874, p. 79—Ghilan).
(2) *Erithacus rubecula caucasicus*, But. (Orn. Monat. 1907, p. 9—Caucasus).

These two races of Robin are inseparable in the field and the field notes probably apply to both. Buxton at Amara found Robins to arrive about 20th—23rd of October and soon became common, some passed on in November and the rest wintered in the gardens and thick *Prosopis* scrub; about the middle of January they began to sing and they disappeared during the third week of February. Both races were present at Amara. Pitman found Robins fairly common in thick scrub in the Adhaim and Samarra areas during November and December and met several in reeds and rushes at Kurna on January 17; his records also apply to both races. I came across Robins not uncommonly at Basra in November frequenting date palms, gardens and willows bordering the river, I found them very shy and skulking and their weak winter song sounded to me much like the English birds; my birds were all *hyrcanus*. Robins are recorded in winter at Ramadi, Tekrit, Kut, Fao and as late as March 14th at Shus, so that one may say one or both races are fairly common throughout the area in suitable places. Both races are listed as winter visitors to the Karun area by Zarudny, who also includes the European Robin, while of one got in January at Ras-el-Ain between Mosul and the Syrian border Neuman says it matches well the European bird; none of the skins which I have examined can be however assigned to this race.

Nineteen skins examined:

E. r. hyrcanus: Amara, 23-10-18, 16-2-18, 5-12-17, 20-10-17 (two) (P. A. B.); Baghdad, 27-1-19 (P. Z. C. and R. E. C.); Abed, 8-2-18 (F. M. B.); Basra, 20-1-17 (four) (C. B. T.); Samarra, 13-12-17, 7-3-18 (C. R. P.). *Caucasicus*; Amara, 31-10-18, 20-10-18, 11-1-18, 3-11-17 (P. A. B.); Samarra, 14-12-17, 4-11-17 (C. R. P.).

E. r. caucasicus stands intermediate between *hyrcanus* and the typical race in colour of the back and throat, it has a smaller bill than *hyrcanus* and less red brown on the upper tail coverts. Most specimens can be picked out easily but two of Buxtons were rather intermediate between the two races.

127. White-throated Robin. Irania gutturalis.

Irania gutturalis, Guérin (Rev. Zool., 1843, p. 162—Abyssinia).

This species appears to be a scarce passage migrant and was only noticed in spring ; it is probably commoner than the records indicate however, as it is an arch skulker. Pitman met with two pairs in willows and scrub at Feluja between April 27th and May 3rd and obtained one specimen, he found them almost impossible to beat out of the scrub they inhabited. Cheesman met with a pair at Sheik Saad on April 5th hopping about a stack of brushwood in some grass.

Magrath noted it at Basra as early as March 25th and Armstrong found several pairs at Fao on April 22nd. At Urfa Weigold records odd birds on April 15th and 28th. Zarudny gives it as a passage migrant and also as a winter visitor in small numbers in the Karun district. It breeds in the Zagros and the highlands of W. Persia.

128. Wren. Troglodytes troglodytes. subsp., ?

Logan Home says that he saw one or two Wrens in sheltered nullahs at Kelat Shergat in winter and one on the uplands at Tekrit in a ravine in December. Ludlow saw one at Hit on March 8th. Without specimens it is impossible to say what Wren visits Mesopotamia. *hyrcanus* has been described from N. Persia, *zagrossiensis* from the Zagross Mountains in S. W. Persia by Zarudny and Loudon, while according to the former another race *subpallidus* inhabits Khorasan.

No Accentors are recorded from Mesopotamia.

129. Common Swallow. Hirundo rustica.

Hirundo rustica rustica, L. (Syst. Nat. Ed. x, p. 191, 1758—Sweden).

The Common Swallow may be said to be a summer visitor, though in parts of Mesopotamia, such as Fao, they are only entirely absent during December and January. The first ones may be looked for from the 10th to 20th of February, but in some places, or more probably in some years, quite a number have put in an appearance by the middle of the month. Thus at Samarra and Sheik Saad in 1918 they were numerous by mid-February (first seen on 5th and 10th respectively) and had even started to build, though March is the more usual month for nesting to begin. They breed throughout the area in suitable localities, choosing varied sites, huts of natives and telegraph buildings (Fao) and houses in most places, cliffs and even tent poles of the camps. As elsewhere two or more broods are probably raised as fresh eggs are reported on April 20th, and young on the wing on April 26th. Many move off again at the end of August and they are scarce early in September.

The numbers seem to fluctuate during this month probably due to passage migrants, as many must pass through Mesopotamia to and from breeding grounds further north. I noted them crossing the head of the Persian Gulf on March 20th when the local birds would be settled down to nest. The last seen in autumn were in the last days of October.

Three skins examined ; ♀, Bagubah, 29-7-18 (P. A. B.); Kazimain, 27-3-19 (P. Z. C. and R. E. C.); Samarra, 3-18 (C. R. P.).

These are not to be differentiated from the European bird. Pitman records that at Feluja on March 19th—31st he saw a few pairs of Swallows with chestnut red underparts and again a few at Samarra in February. They did not appear to him to be so deep a red as the Egyptian bird, and they were evidently on passage.

His description of course tallies well with the Palestine form *transitiva* which might wander to this part of Mesopotamia, but in absence of specimens I cannot definitely include it.

Weigold only met with the typical form at Urfa.

130. Red-rumped Swallow. Hirundo daurica.

Hirundo daurica rufula (Temm. Man. d'Orn. 2, Ed. 3, p. 298. 1835—Egypt).

This species appears to be rare ; Pitman saw two on passage at Feluja on March 26th and Cheesman met with several pairs at Maidan-i-Napthun on May 28th and found colonies on two occasions in caves bordering on a stream. Tomlinson recorded two pairs near Ahwaz in April 1908 and also two pairs building at Shustar on April 19th and thinks the latter were driven away by Common Swallows which were nesting there. Zarudny lists it as a winter visitor and passing migrant in small numbers in the Karun district.

131. House Martin. Delichon urbica.

The only records are those of Buxton who says that this species arrived at Amara on April 5th, 1918, and remained till May 5th. Weigold noted it in Syria on April 30th but not within the borders of Mesopotamia. It apparently is a scarce passage migrant. No specimens obtained and so I leave it under the binomial name.

132. Sand Martin. Riparia riparia.

Riparia riparia riparia, L. (Syst. Nat. Ed. x, p. 192, 1758—Sweden).

This is a common summer visitor to the Euphrates and Tigris, building in suitable places. It arrives in the last days of March and migrants pour in during the whole of April, some to remain, others passing north. A few may be seen earlier in March as I saw one at Basra on the 18th and two more near Shat-el-Arab L. Vessel on the 20th ; Cheesman noted first arrivals on the 29th at Sheik Saad, and Pitman on the 30th at Kut.

At Fatah Gorge, Cheesman saw a great migration on April 18th following the line of Jubel Hamrin. It breeds in the steeper banks of the rivers in numbers, there being colonies at intervals all the way from Kurna to Baghdad. Logan Home noted tunnelling operations on June 6th at Daur and fresh eggs were obtained on June 14th. At the end of June great numbers began to collect into flocks and probably some move off during July and August ; in September great numbers are still to be found these left being doubtless reinforced by passage migrants from elsewhere ; most have gone by the third week in October, but Cumming at Fao recorded it in every month except January and February.

Five skins examined : ♂, Amara, 7-9-18, W. 109 ♂, 3-9-18, ♂, 14-4-18, W. 109, (P. A. B); Kurna, 4-7-17, W. 100 (P. Z. C. and R. E. C.), I cannot separate these in any way from the typical European race.

133. Pale Crag Martin. Riparia obsoleta.

Riparia obsoleta, Cab. (Mus. Hein. 1, p. 50. 1850—N. E. Africa.)

Recorded by Zarudny as a passage migrant in the Karun district.

134. Syrian Woodpecker. Dryobates syriacus.

Dryobates syriacus, H. and. E. (Symb. Phys. Aves fol. r., 1833—Mt. Lebanon).

Weigold records odd ones in April at Urfa where he supposes it is resident. No records elsewhere. Common in the Zagros.

135. Wryneck. Jynx torquilla.

Jynx torquilla torquilla, L. (Syst. Nat. Ed. x, 1, p. 112, 1758—Sweden).

Not very common, or else overlooked, as a passage migrant. Cheesman met with four on autumn migration at Gurmat Ali and Logan Home saw three at Basra on September 18th ; Buxton saw two at Baghdad on September 24th and 29th. It is recorded from Samarra on April 5th, Logan Home saw it at Basra in the third week of April ; Cheesman records it at Ahwaz on April 29th and May 24th. Weigold noted it at Urfa also in mid-April.

136. Cuckoo. Cuculus canorus.

Cuculus canorus canorus, L. (Syst. Nt. Ed. x., 1, p. 110, 1758—Sweden).

A passage migrant and not very common judging from the scanty records. The spring migration takes place during the last three weeks of April. It does not sing in the Mesopotamian plain, but Cheesman noted that as soon as it reached the higher Persian plateau it sings and breeds there. In autumn there are only three records August 8th, September 27th, and October 10th.

Cheesman noted that it fed on the caterpillars of the Painted Lady.

Four specimens examined : ♂, Feluja, 16-4-17 ; Adhaim, 27-9-17 (C. R. P.) ; Shaiba, 9-8-16; Kazimain, 9-4-17 (P. Z. C. and R. E. C.).

I cannot separate these from west European birds.

137. Great Spotted Cuckoo. Clamator glandarius.

Clamator glandarius, L. (Syst. Nat. Ed. x, 1, p. 111, 1758—Gibraltar).

Weigold met with several pairs at Urfa in April and thought they would certainly nest in the nests of *Corvus cornix*. Woosnam obtained one at Bund-i-Kir on the Karun on March 6th and Zarudny includes it as a passage migrant. It breeds in the oak woods of S. W. Persia and it is curious that no one came across it in our area.

Swifts. Micropus.

Swifts were badly reported on owing no doubt to the difficulty of distinguishing them and collecting any. The following records *probably* apply to either *murinus* or some race of *apus*.

Swifts were reported as breeding in June in the cliffs at Daur by L. Home and probably breeding (seen in June and July) in the Kerbela district ; there are scattered records of Swifts from February to October at Kut, Tigris R., Adhaim, Basra, Zobeir. Some specimens are noted as arriving at Feluja on April 12th in one year, at Baghdad on March 17th in another. Stoneham saw large migrations of Swifts going north at Samarra on April 29th and onwards till May 17th.

138. Common Swift. Micropus apus pekinensis.

Micropus apus pekinensis, Swinh. (P. Z. S. Lond. 1870, p. 435,—Pekin).

Some race of *apus* certainly occurs at Baghdad where on May 20th Cheesman saw them apparently breeding ; he says that on April 26th about ten pairs had recently arrived and he obtained one which he was certain was *apus* but unfortunately the skin has been lost.

Woosnam obtained one at Shustar on March 21st which has been determined by Witherby as *pekinensis*, which race Zarudny gives as a passage migrant, as he does also the typical race.

139. Pallid Swift. Micropus murinus.

Micropus murinus murinus, Brehm. (Vögelfang, p. 46, 1855—Siut in Egypt).

Cheesman found this Swift common at Ahwaz on May 5th and it was breeding in all the larger houses ; he obtained one specimen. Cumming got two at Fao in March and he records a nest and three eggs taken by his collector at Fao (?). Cheesman is certain that this species also occurs at Baghdad where it was apparently breeding on May 20th. Zarudny gives it as nesting and wintering in the Karun district.

140. Common Indian Swift. Micropus affinis.

The only record is from Shush where Cheesman saw one flying round the castle on May 3rd. Probably it is the race *galilejensis* which occurs.

Photo. Capt. C. R. Pitman.

A.—Curious mound-like nest of Black-winged Stilt with 3 eggs, in a shallow inundation a few miles W. of Museyib on the R. Euphrates. 12-6-17.

Photo. Capt. C. R. Pitman.

B.—Typical breeding country of Sand-grouse (*Pterocles alchata caudacuta*) on right bank of Tigris near Kut. Sept., 1916.

BIRDS OF MESOPOTAMIA.

(Plate V,—Sand-grouse chicks—is unnumbered.)

141. Common Nightjar. Caprimulgus europæus.

1. *Caprimulgus europœus unwini*, Hume (Ibis, 1871, p. 406—Hazara N. W. India).
2. *Caprimulgus europœus sarudnyi*, Hart. (Vög. Pal. F., p. 849, 1912—Tarbagatai Mountains).

These two races are passage migrants through Mesopotamia in fair numbers. The spring passage takes place in the last week of April and the first part of May, and the return passage during September ; latest record October 4th. Cumming says it occurs from autumn to spring at Fao. Zarudny records *europœus* as wintering, and *unwini* as wintering and a passage migrant.

We have no winter records of any Nightjar.

unwini probably breeds in the Jebel Hamrin, as Cheesman obtained one at Khanikin on May 21st, with organs well advanced. Unlike *œgyptius* this species often roosts on date-palm stems and seems to prefer an arboreal seat to the ground.

(1) ♀. Khanikin, 21-5-19 (P. Z. C. and R. E. C.); Shat-al-Adhaim, 4-10-17 (C. R. P.).

These and one from Fao in the British Museum are nearer *unwini* than any other race, but do not seem quite typical, nor is one which Witherby got in Persia, nor one from Shiraz ; but apparently *unwini* varies much even in N. W. India. If one had a larger series from Persia perhaps another race could be recognized. The Adhaim bird is a young bird and matches well a young one from N. W. India.

(2) ♂, Shaiba, 8-9-16 (P. Z. C. and R. E. C.); ♂, Amara, 24-4-18 (P. A B); ♀, Fao, 7-4-18 (Armstrong).

I cannot separate these from birds from Krasnoyarsk, etc., they certainly are not *unwini*, they are much darker and much more coarsely marked.

142. Egyptian Nightjar. Caprimulgus ægyptius.

Caprimulgus œgyptius œgyptius, Licht. (Verz. Doubl. Mus. Berlin, p. 59, 1823—Upper Egypt.)

This Nightjar is a common summer visitor and a numerous passage migrant. The earliest record is March 20th and most come quite early in April and settle to breed in many places throughout the area ; it is particularly common in the Feluja-Baghdad-Museyib district.

Nests may be found in a variety of situations, as on shingle near the river at Samara, coarse grazing land, bare desert, in scrub under bushes, etc. The earliest nest recorded was on April 12th and two more on the 14th (Feluja district), though Tomlinson says at Basra they do not breed till the end of May. Fresh eggs are recorded on June 3rd and incubated ones on the 28th. Two is of course the invariable number. When nesting on grazing land many eggs are trodden on by cattle.

It becomes exceedingly plentiful in August and September when probably the local birds are reinforced by migrants from elsewhere, though it seems to be particularly patchy in distribution, one place holding numbers while in other similar localities none are seen ; thus Buxton knew of a small walled garden at Amara about half an acre in extent where he could always find a dozen or so and never saw them elsewhere ; Pitman too found hundreds roosting on a certain patch of stony ground at Akkarkuf, while Magrath relates how in riding across some old fallow land the birds were so numerous that it looked as if the clods of earth were getting up and flying away ! At Ali Gharbi Cheesman saw numbers flying aimlessly about slowly and not feeding at 4-30 P.M. on August 8th, and he fancies the ground had got too uncomfortably hot for them with a shade temperature of 120°. In the day time they are found roosting on the ground in palm groves. The night call is described by Pitman as being like rapid hammering on wood " toc-toc-toc-toc."

Most leave in September and there are only odd records after the first week in October up to the 22nd.

Zarudny gives this species as nesting ? and passage migrant ? both of which there is no shadow of doubt about and he also definitely states that it is to be found in winter, a statement which none of our records bears out !

Eleven skins examined: ♂, Baghdad, 30-7-18; ♀, Amara, 9-9-18; ♂, Kurna, 20-3-18; ♂, Baghdad, 15-9-17 (P. A. B.); ♂, Shaiba, 12-9-16, ♀, 3-9-16; ♀, Sera, 2-5-19 (P. Z. C. and R. E. C.); ♀, Feluja, 12-4-17; Hindeyeh Barrage, 3-6-17 (C. R. P.); ♀, Basra, 11-8-19 (L. Home) Amara, 4-4-19 and 4 in B. M. from Fao. Wings 190-206 mm.

All are typical *ægyptius*; *arenicolor* (of Sewertzow : type loc. Oxus) does not appear to me to be a good race so far as I can judge ; one specimen from there is certainly large (W. 212) but another is only 202 mm., and specimens from Samarkand are no larger than Egyptian ones.

143. European Bee-eater. Merops apiaster.

Merops apiaster, L. (Syst. Nat. Ed. x, 1, p. 117, 1758—S. Europe.)

To most parts of Mesopotamia this is a common passage migrant but to parts of the foot hills it is a summer visitor. It arrives at the end of March and migration continues up to the second week in May. It is widely distributed and migrating flocks were noted passing over in several localities from Urfa to Fao.

According to Tomlinson it breeds up the Karun river where he found young just hatched at the end of May; up the Kerkha river Cheesman found it gradually replacing *persicus* as a breeding species, and he saw excavations going on at Shush on May 2nd, where *apiaster* alone was breeding in thousands. This replacing of the one species by the other is not universal by any means, as in many places throughout their distribution both species breed in the same area. At Mosul it evidently breeds, as Sassi records skins thence early in June and it may possibly breed at Khanikin (and elsewhere in the hills) where Cheesman saw it on May 21st.

The autumn passage lasts from the first week in September to the first week in October.

Three specimens examined : ♂, Shush, 3-5-17 (P. Z. C. and R. E. C.); 2 Baghdad and Amara (P. A. B.)

144. Persian Bee-eater. Merops persicus.

Merops persicus persicus, Pall. (Reise (*d*). versch. Prov. Russ. Reichs. ii, p. 708, 1773—Shores of the Caspian).

Like the Roller this species is a summer visitor in very large numbers and also a passage migrant. The first arrive in the middle of March and it becomes common by the third week. Migration was seen going or across the head of the Persian Gulf on March 20th and April 11th.

It occurs and breeds throughout our area from Mosul to Fao but at Shush Cheesman noted that it was replaced by *apiaster*, but as *persicus* breeds in N. Persia this must have been a local peculiarity. It breeds in colonies, some of them numbering thousands of individuals ; the sites chosen are river and canal banks, desert mounds or perfectly flat bare ground. Cheesman noted that at the oil fields *persicus* seemed to prefer a horizontal road passed over by caravans and other traffic, while *apiaster* preferred mounds; Pitman found a large colony near Museyib in perfectly flat ground close to a road ; the birds were swarming over the nest holes like bees ! Sassi describing a similar colony (of which he gives a very good photograph) says the nesting ground in the distance looked like green pasture with the multitude of birds on it ! Other very large colonies exist between Baghdad and Samarra and at Abu Aran near Basra.

Excavations for the nest-holes were noted on April 19th, and the earliest date for eggs is May 5th, but it is not till towards the middle of the month that full clutches need be looked for ; six is the normal full clutch, and in one nest of six

it was noted that some were near hatching, while others were half incubated only.

Young well fledged are reported in mid-June. The nest holes go in 5 to 7 feet and if in flat ground at an angle of 10 to 15 degrees ; the entrance holes are hard and worn smooth by the constant passage of birds.

The war did much to accommodate this bird in providing miles of perch in the form of telegraph wires and nesting sites in abandoned trenches.

This Bee-eater moves off again at the end of August, and flocks migrating over, going in some southerly direction, were noted on many days during September in several places, and up to October 13th. Cheesman noted that they migrated by night as well as by day, and their distinctive calls were often to be heard on dark nights in September as the flocks passed over. Towards the end of October they became scarce and there is an odd record on November 14th.

The Arabic name for both species of Bee-eaters and Roller is the same—Khundar.

Specimens examined : ♂, Amara, 6-6-18. *Juv.* 5-7-18 (P. A. B.); Nahr Umar, 26-3-18 (two) (C. R. P.) ; Baghdad, 17-8-17 (Ingoldby) ; Shaiba, 12-9-16, 18-9-16 (P. Z. C. and R. E. C.) ; ♂, Basra, 18-3-18 (C. B. T.).

The young leave the country in their juvenile dress.

145. Little Green Bee-eater. Merops orientalis. (-viridis auct.)

Merops orientalis beludschicus, Neum. (Orn. Monat. 1910, p. 80—Persian Beluchistan).

We have no certain record of this bird ; however it must occasionally occur as Cumming noted it once at Fao after a severe storm. Zarudny says it nests in small numbers in the Karun district and is a migrant ; it has been met with at Bushire in January to March and occurs along the south coast of Persia. St. John (Eastern Persia, p. 125) says it extends to Basra, if that is so I must have overlooked the record.

146. Hoopoe. Upupa epops. "Had-Had."

Upupa epops epops, L. (Syst. Nat. Ed. x) i, p. 117, 1758—Sweden).

It is chiefly as a passage migrant that the Hoopoe occurs in Mesopotamia though a few pass the winter in suitable localities and odd ones are met with in the breeding season, but there is no evidence that they nest in our plains ; however it certainly breeds at Urfa and may do so in our hills, as it appears in the plains very early in autumn.

Though occasional birds are recorded in December to February, it is not until the second week in March that the migration sets in, and Hoopoes become very common towards the end of the month ; the migration continues during April and most have passed on by the end of the month. There is a single record in June from Amara and several other indefinite records of birds being seen during "the summer." Odd ones are recorded in the last half of July near Baghdad, probably early migrants from not far off ; it becomes common by the middle of August and is plentiful up to the first week in October, but most have gone by the middle of that month. Migrants were noted in the middle of the Gulf on August 13th and 31st.

Weigold records it breeding in pollarded mulberries at Urfa. Zarudny says *epops* and *loudoni* are winter visitors to the Karun ; the latter is a synonym of the former (*vide* Hartert, Vög. Pal. F., p. 867).

The Arabic name is of course onomatopœic and widely used in the east for this bird.

Four specimens examined: ♀, Shaiba, 8-9-16 (P. Z. C. and R. E. C.); Basra, 17-8-17; Kurna, 17-3-18; ♂, Amara, 25-2-18 (P. A. B.).

147. Common Kingfisher. Alcedo ispida.

1. *Alcedo ispida pallasii*, Rchb. (Handb. Spec. Orn. Inv. Alcedineæ, p. 3, 1851—Volga).
2. *Alcedo ispida pallida*, Brehm. (Vogelfang, p. 51, 1855—Egypt).

(1) A resident in the Mesopotamian plain whose numbers are increased by winter visitants. This Kingfisher is perhaps not common as a breeding bird or else it retires to less frequented spots, as most observers considered it to be a winter visitor. It is reported as breeding however at Baghdad and Basra by Cheesman, while Tomlinson's records of *bengalensis* breeding at Basra must belong to this race. Cumming records it at Fao from August to April and specimens sent home were identified by Sharpe as *bengalensis* ; I have examined these and I consider them to be *pallasii*. Pitman noticed this Kingfisher at Feluja till April when it disappeared, and during the summer he found none in the marshes near there nor at Museyib. In winter even it seems rather local and in places quite common, thus it is reported common at Basra and Baghdad and rare at Amara.

Five specimens examined : Basra, 4-2-17 (Armstrong) ; Kurna, 17-3-18 ; Akkarkuf, 21-8-17 (C. R. P.) ; Baghdad, 26-9-17 (P. A. B.), ♀, Basra, 18-2-18, also two from Fao in B. M.

These correspond best with *pallasii* ; the bills do not appear to me to be so long and slender as in *pallida* ; they are too large and not bright enough for *bengalensis*. Wings 72-74. Bills 37-38 from feathering, 42-44 from base. No specimens were obtained in the breeding season but in absence of any other race one concludes that this is also the breeding form.

(2) One obtained by Weigold at Urfa, April 21st (wing 74, bill 40) is recorded by him as *pallida* ; Neumann also considers one obtained at Ras-el-Ain on February 7th, with a remarkably slender bill of 41 mm. to belong to this form.

148. Pied Kingfisher. Ceryle rudis. "Esleligga."

Ceryle rudis rudis, L. (Syst. Nat. Ed. x, p. 116, 1758—Egypt).

A very common resident from Fao and the Karun river to Mosul but naturally few are met away from canals or rivers. It is commoner below Amara than above, but it is common above Baghdad on both the Euphrates and Tigris.

There are colonies all the way up the Tigris where the banks are high and Pitman records a colony at Kurna, consisting of hundreds, in a bank which is unaffected by floods and so affords a secure nesting place each year. Eggs are reported early in June and five seems to be the usual number.

This Kingfisher seems to prefer the shallower parts of the river and backwaters to the deeper water ; Buxton met with it in the Hawizieh swamp in July many miles from land. The flocking and flighting to roost in the evening up the river must have struck the least observant and the shrill cry of several together is bound to attract notice.

Five specimens examined : ♂, Qalet Saleh, 26-5-18; ♂, Baghdad, 21-9-17, ♀, 26-9-17 (P. A. B.) ; ♀, Kurna, 30-12-17 (P. Z. C. and R. E. C.) ; Basra, 12-5-19.

These are typical *rudis*, and not the Indian form, with the base of the tail spotted and longitudinal streaks on the flanks.

149. White-breasted Kingfisher. Halcyon smyrnensis. "Mahel-Hel."

Halcyon smyrnensis smyrnensis, L. (Syst. Nat. Ed. x, p. 116, 1758—Smyrna).

This Kingfisher has rather a curious distribution in Mesopotamia ; up as far as Nasiriyeh and Kurna it is fairly common and resident ; at Amara Buxton only saw it twice in 13 months, *viz.*, August 31st and April 5th and he thought these must have been migrants, a statement supported by Cheesman who says the only one he saw at Sheik Saad (April 5th) was migrating. On the Euphrates

above Nasiriyeh we have no records, and above Kurna only records of probable migrants. At Baghdad however it occurs again and is probably resident there in small numbers, as Cheesman noted it there in April, Pitman in July to September, and Buxton in October. On the Diala R. at Bakubah however it again is common and a few occur at Shahroban. It occurs at Shush and on the Karun river and breeds there. It is absent from the Tekrit-Samarra district. The distribution is no doubt to some extent influenced by date groves.

It breeds at the end of April and beginning of May. Hobkirk found nests in holes in a bank on May 19th and 21st containing 5 and 4 eggs respectively. Armstrong found a nest at Fao on May 4th.

Five specimens examined : ♀, Kurna, 17-5-18 (P. A. B.); Akkarkuf, 20-8-17 (C. R. P.) ; ♀, Baghdad, 16-3-19 (P. Z. C. and R. E. C.); Kurna, 17-3-18 (?); ♂, Basra, 21-11-17 (C. B. T.). All are typical.

150. Common Roller. Coracias garrula. "Khundar."

1. *Coracias garrula semenowi*, Loud. and Tsch. (Orn. Jahrb. xiii, p. 148, 1902—Transcaspia).
2. *Coracias garrula garrula*, L. (Syst. Nat. Ed. x, p. 107, 1758—S. Sweden).

A common summer visitor whose numbers are increased at the times of migration by passage migrants through the country.

The first few appear in the first week of April but the general date of arrival is about the third week of the month, while many pass through in May, as Cumming records at Fao. Pitman noted small flocks at Feluja from April 4th to 30th, 6 to 12 in a flock migrating over going west or north-west and a similar migration was recorded at Basra at the end of the month.

It breeds commonly throughout our area, where conditions are suitable, from Mosul to Ahwaz ; but a few breed at Basra and none, probably due to lack of suitable sites, at Fao.

Cliffs of river banks are favourite sites and there are colonies on all the Mesopotamian rivers, the ruins of Babylon and the mounds of Shush are full of their nesting holes and occasionally holes in date palms are utilized as at Baghdad and Museyib. Pitman, who examined a large colony in the river bank at Feluja, found the nests in weather-worn holes and clefts 10 to 40 feet up and frequently near the top ; the entrance holes were large and the eggs were deposited on soft sandy soil not more than a foot in.

The excavation of holes begins at the end of April and fresh clutches are general by mid-May. Pitman, who examined two dozen nests on May 25th, found them to contain 3 to 7 eggs in various stages of incubation and one lot had hatched. In the middle of this colony a Kestrel also had its nest.

Some evidently move down from the hills to the plains as early as the end of July ; the numbers decrease at the end of August and early September, in which month most depart ; the last record is October 2nd. Cumming says they pass Fao on passage in September and October, they are few in number and only halt a short time.

(1) Seven specimens examined : ♀, Shustar, 3-5-17 (P. Z. C. and R. E. C.) ; ♀, Shahroban, 30-7-18 ; ♂ ♀, Amara, 2-5-18 (P. A. B.); Baghdad, 7-17; Hindeyeh Barrage, 2-7-17 ; Akkarkuf, 29-8-17 (C. R. P.).

(2) Mesopotamia, 23-4-17.

All belong to the eastern form *semenowi* except one which I cannot separate from the typical race ; Zarudny records *semenowi* as a passage migrant and the typical race as rare ; Weigold and Neuman record the latter race from Urfa and Ras-el-Ain. Our breeding race is certainly *semenowi* ; the typical race is presumably a passage migrant.

Semenowi in the adult spring plumage is rather indistinct; perhaps on the whole it is a trifle paler brown above and paler blue on the underparts and wing coverts

In the juvenile dress however the differences appear to be much more distinct. Two juveniles from Sweden I have seen are very dark birds, from which the juveniles of *semenowi* can be picked out at a glance by their paler mantle and underparts.

There is no very marked difference in size between these two races, a series of the typical form measure 191-202 mm. and of *semenowi* 193-206 (once 212) (c. f. Hartert Vog. P. Faun., p. 873) I find *semenowi* in winter from Suakim, Khartoum and Parragani R. The adults moult before leaving the country, the young ones migrate in their juvenile dress.

151. Indian Roller. Coracias benghalensis.

Coracias benghalensis benghalensis, L. (Syst. Nat. Ed. x, 1, p. 106, 1758—Bengal).

The occurrence of the Indian Roller in Mesopotamia is very interesting as it is an example of a bird extending its range westward from India along the Persian Gulf. In Persia it is only found in the coastal parts and its distribution corresponds with that of the date palm. So too in Mesopotamia it is confined to the date palm area on the Shat-al-Arab ; from Fao to Basra it is fairly common, above Basra stragglers may be met with at Shafi and Nahr Umar, and Amara, above which there are no records ; nor are there any records on the Euphrates. Zarudny gives it as nesting in the Karun district, but this includes Mohommera where we know it occurs ; we have no records of it from higher up this river. Where it occurs it is quite resident.

It breeds at the end of April usually selecting a hole in a date palm, but Magrath notes nests also in walls in Basra. Young are out by the end of May and again at the end of July according to Tomlinson, so it probably breeds twice.

Two examples examined : ♀, Qalet Saleh, 6-1-18 (P. A. B.) ; Nahr Umar, 25-3-18 (C. R. P.).

These quite resemble birds from Bengal.

152. Eagle Owl. Bubo bubo.

Bubo bubo ruthenus, But. and Zhitkov (Mem. Soc. Imp. Geogr. Russ. XLI, 2, p. 272, 1906—Simbirsk, Volga).

The Eagle Owl appears to be rare or perhaps very local in Mesopotamia and, may be, in the Jebel Hamrin is not so uncommon. It certainly occurs in the Tekrit cliffs where L. Home and Aldworth found it in pairs in January and obtained an egg laid on a shelf of the cliff ; Hobkirk saw one further up the river at Istabulat feeding young, and Meinerzhagen records one from the ruins of Babylon. Tomlinson took a small addled egg from a nest of a large unidentified owl at Ahwaz. A specimen was obtained at Shahroban in December 1918 and another at Sulemania by Ross. These and one in the British Museum labelled Mesopotamia from one of the old expeditions are the only skins available. These three skins resemble one another and also two skins from Trebizond, and I consider them to belong to the race *ruthenus*, a conclusion which Dr. Hartert, who kindly examined them also, independently came to. Sassi recording two birds from Mosul in January and February says he could come to no conclusion about them ; they did not belong to the typical race and approach *turcomanus* on the one hand and *nikolskii* on the other ; the wings measured 445 and 385 mm. respectively (unsexed). This latter race Zarudny described from the Jebel Tnüe in Arabistan (Orn. Jahrb., 1905, p. 142); it appears from his description to be a very small Eagle Owl (wing ♂, 378; ♀, 394 mm.), and our three Mesopotamian specimens cannot be this with wings (unsexed) 445, 457 and 465 mm. He says his *nikolskii* occurs as a resident in small numbers in the Zagros and Karun districts.

Without more material no one can possibly define the status of the race or races of this fine Owl in Mesopotamia, and so I leave all our records under *ruthenus*,

though *nikolskii* may also have to be accepted as a different form in the Karun area when specimens thence materialize.

(We have no records of any Fish-owl (*Ketupa*) occurring in Mesopotamia though it may do so in the Karun district, as Zarudny described a race *semenowi* from the Zagros, where it is common.)

153. Striated Scops Owl. Otus brucei. "Boomer." (All owls).

Otus brucei (Hume) (Stray Feathers, i, p. 8, 1872—Rahuri near Ahmednagar).

Cheesman found this owl in gardens with dense foliage of date and orange trees at Kazimain on March 29th where they were probably breeding, as a pair shot then had organs in an advanced state and the birds were still there on May 12th. Livesay found it common at Hilla and Museyib and obtained a specimen at the former place on July 13th, while eggs of a Scops of some species, very likely this, were brought in to him.

Cheesman notes that it takes insects on the wing and flies as fast as a bat; it feeds before dusk, but it is not seen in the day time. The call is a short monotonous "boo-boo" resembling that of a Stock Dove. He says: "The note is quite different to that of *pulchellus* which I found breeding at Gulanak near Teheran in June 1917 where it was plentiful; the note of this latter bird resembles the tinkling of a small brass bell and, as the birds seldom have exactly the same note, the combined effect of several is like an erratic peal of small bells; the "boo-boo" of the Kazimain owl was not once heard there and *vice versa*. *Brucei* has also another note, a sort of squeak; the Arabs say it breeds in holes in mulberry trees."

The Striated Scops Owl is probably resident where it occurs; beyond the above records there is no certain information regarding its distribution in Mesopotamia; it extends from India to Palestine.

Three specimens examined: Kazimain, 30-3-19; ♀ 29-3-19 (P. Z. C. and R. E. C.); Hilla, 13-7-16 (Livesay).

These match well a series from India, and the type specimen, in colour, size and wing formula.

154. Scops Owl. Otus scops.

Otus scops pulchellus, Pall. (Reiss. d. versch. Prov. Russ. Reiche 1, p. 456, 1801—Volga).

A Scops of sorts is recorded from Basra by Magrath, and Aldworth took a clutch of 3 Scops owl's eggs on May 3rd at Nasirijeh which Mr. Jourdain identifies as *pulchellus* (?).

The only certain records are of a bird obtained at Amara on April 11th and those of Cumming who met with it at Fao twice in October and once on April 22nd. The status of this owl requires further investigation and its breeding in Mesopotamia cannot be said to be proved.

This eastern race is not a very marked one and I am in doubt if the Mesopotamian birds belong to it or not. Further material is necessary to decide but for the time being I leave them under this race. According to Zarudny the typical race breeds in the Zagros.

155. Long-eared Owl. Asio otus.

Asio otus otus, L. (Syst. Nat. Ex., p. 92, 1758—Sweden).

Buxton states that one was shot by Capt. Downie at Amara on November 24th and that he examined it. Aldworth met with a party of 15 in palm groves at Nasarijeh on December 8th and secured one, and Livesay got one at Legait on April 21st. It must be a winter visitor.

156. Short-eared Owl. Asio flammeus.

Asio flammeus, (Pontopp.) (Danske Atlas. i, p. 617, 1763—Denmark.) =(*accipitrinus* auct).

Common winter visitor in suitable places and widely distributed. It arrives about the middle of September and leaves again towards the end of March ; odd birds were reported up to April 21st. It frequents crops, such as lucerne and young corn, desert scrub, grass lands and even bare desert ; and sometimes four or five may be flushed off the ground in close proximity. Magrath found it common round the Sanniyat position attracted by the small rodents which infested the trenches.

Specimens examined : ♀, Amara, 22-10-17. 0? 23-1-18. (P. A. B.), ♂. Kut, 20-2-17, 0 ? 19-2-17 (C. R. P.) ; Qalet Saleh. 25-11-17 (P. Z. C. and R. E. C.) ; Suleimania. 1-1-20 (Ross).

I do not feel quite certain about the validity of the pale eastern race (*leucopsis*); one of the above (Qalet Saleh) only is a pale bird, the rest are as dark as west European examples.

There are seven other specimens in the B. M. from Mesopotamia mostly from Fao which Mr. Kinnear has kindly examined for me, three are light birds October and March and four are dark birds (one October and the rest bear no date). He remarks that there are in the Museum pale breeding birds from Siberia, but also a dark August bird, while one from France is as pale as any from Krasnoyarsk, and I may add I have an exceedingly pale bird from Norway.

157. Little Owl. Athene noctua.

Athene noctua bactriana, Hutt. (J. A. S. B. 16, p. 776, 1847—Kandahar).

The Little Owl is resident throughout Mesopotamia wherever there is suitable accommodation for it ; but it would seem to be commonest in the Samarra-Tekrit area where cliffs afford unlimited nest holes. In some places, as at Amara, they are not very common but even the oasis of Shaiba has its pair, which frequent the old mud fort. Elsewhere ruins, cliffs, brickfields, etc., are tenanted, and Pitman found one two feet down a rat hole in bare desert. Pitman notes that they begin calling at night at the end of January and pairing takes place early in February. Cheesman witnessed a fight between one of these owls and a pair of See-See for possession of a hole in a conglomerate cliff on April 19th, and though no eggs were found several were seen outside suitable holes in this cliff at Samarra. It is reported as breeding in the cliffs from Samarra to Tekrit in numbers. Like Little Owls elsewhere this race does not shun daylight and may be seen sitting near its hole even in the hot sun and often feeding in the daytime.

Eleven skins examined : Shaiba, 22-9-16 ; Samarra, 30-11-18, 19-4-19 ; Amara, 9-2-18, 4-2-18 (P. Z. C. and R. E. C.) ; Adhaim, 26-10-17, 22-10 17 (two) (C. R. P.) ; Amara, 26-10-17 (P. A. B.) ; Suleimania (Ross).

These vary somewhat in the colour of the upperparts even in the same locality ; they are too dark, not pale sandy enough above for *lilith* (from Palestine), and they certainly are not *glaux* (Egypt) and they match pretty well a series of *bactriana* from Kandahar ; the feathering on the toes varies ; *on the whole* these are less feathered than *bactriana* and more so than *lilith* but some are as fully feathered as the former usually is, while in two or three skins from Kandahar in winter the toes have little more than bristles on them. Apart from individual variation in colour, season also makes a difference and *bactriana* in spring is noticeably paler than in autumn. On the underside these Mesopotamian birds have the steaks not so yellowish-red as in *lilith*.

Zarudny records *glaux* from the Karun district and both *glaux* and *bactriana* as resident in the Zagros. Meinertzhagen says he saw *glaux* commonly at Babylon. From Mosul, Sassi records two as *bactriana* (?) and says the adult bird is quite like *glaux* ! Weigold identifies as *glaux* a mummied bird obtained in winter at Urfa while the type of *lilith* comes from the upper Euphrates at Der-ez-Zor (between Deir and Aleppo) and Hartert records this race form S. W. Persia !

In my opinion birds from Shustar in the south to Samarra in the north of our area are *bactriana*, what race really occurs in Northern Mesopotamia seems somewhat uncertain, I have seen no skins thence, but certainly none of our skins are *glaux*.

158. Barn Owl. Flammea alba. (=Strix flammea auct.)

Flammea alba alba, Scop. (Annus 1, Hist. Nat. p. 21, 1769—N. Italy).

Resident in small numbers throughout the area in suitable places. Wherever it occurs it probably breeds ; it is recorded in the breeding season from Samarra, Mosul, Babylon, between Museyib and Baghdad, Basra, and Fao, frequenting ruins, disused canals, chimneys, and old buildings. Livesay records taking a nest of 10 eggs between Museyib and Baghdad in April and Cumming records it as breeding at Fao in a loft.

One skin examined : Amara, 3-12-18 (P. A. B.) and two others in the B. M. Fao, February 1885, and Babylon-n. d.

All these three are similar and match British ones very well, they are pale yellowish, not at all grey on the back, and have very few spots underneath. A bird from Muscat in Arabia seems also to be like this race.

159. Peregrine Falcon. Falco peregrinus. "Shaheena."

1. *Falco peregrinus calidus*, Lath. (Ind. Orn., 1, p. 41, 1770—India).
2. *Falco peregrinus babylonicus*, Scl. (Ibis, 1861, p. 218-220—Oudh in India).

(1) A winter visitor in small numbers more especially frequenting inundations, etc., where wild fowl abound. The earliest record is September 22nd and the last in the first week of April ; it is distributed throughout our area.

Logan Home records one eating a Lesser Tern, while Cheesman writing about one he obtained at Baghdad notes the following debased habit : " These Falcons wait near the larger towns during winter's evenings and prey on the earlier bats. These fall easy victims, but occasionally one is missed and falls like a stone some twenty feet and then continues on ; the Falcons do not give chase but pass on to another bat, even small bats not being despised."

Four skins examined : ♂, Amara, 3-12-17, 14-3-18 (P. A. B.) ; ♀, Kazimain, 4-4-19 ; Baghdad, 7-11-18 (also two from Fao in B. M.).

The adults match *calidus* well with the broad white cheek patch ; two are young birds.

(2) Donald records that this Falcon (*sub. nom. F. barbarus*) is not uncommon at Basra and appears to be somewhat crepuscular in habits and sits on the ground about sunset, apparently watching for bats. Armstrong obtained a young female at Basra on December 15th. Magrath says it arrives with the ducks. Sassi records it from Mosul on June 10th.

160. Lanner Falcon. Falco biarmicus.

Falco biarmicus tanypterus, Schleg. (Abh. Geb. Zool. u. vergl. Anat., 2. Hefte, 3, p. 8, 1844—Nubia).

One obtained by Cumming at Fao on August 30th is in the British Museum. It was recorded by Sharpe as *feldeggii* in the Ibis. 1891, p. 104.

161. Saker Falcon. Falco cherrug.

1. *Falco cherrug cherrug*, Gray (Hardw. III. Ind. Zool. 1833-34—India).
2. *Falco cherrug milvipes*, Jerd. (Ibis. 1871, p. 240—Umballa, Punjab).

Cherrugs are fairly common winter visitors ; they were noted by Buxton at Amara, at Samarra by Pitman, while Cheesman also noted a good many near Baghdad in November sitting on telegraph poles. Donald records that he saw

one strike a Sand-grouse near Sheik Saad, but it had to give up its prey to a Steppe Eagle. All except one from Ahwaz belong to the typical race.

(1) Specimens examined ♂, Amara, 1-12-18 (P. A. B.); ♀, Baghdad, 26-12-17 (Ingoldby); ♀, Samarra, 30-11-18 (P. Z. C. and R. E. C.).

(2) ♂, Ahwaz, 12-2-18 (F. M. B.).

162. Hobby. Falco subbuteo.

Falco subbuteo subbuteo, L. (Syst. Nat. Ed. x, 1, p. 89, 1758—Sweden).

A fairly common passage migrant arriving in the last week of April and passing on by the middle of May; it reappears in the first week of October and has gone further south by the end of the month. It is partial to the date groves. Pitman thinks he saw this species at Museyib in June and July and thought it might breed there; further evidence on this however is required.

Three specimens examined: ♂, Amara, 1-5-18 (P. A. B.); ♀, Azizieh, 16-10-18 (P. Z. C. and R. E. C.); ♀, Amara, 18-4-17 (L. Home).

These match European specimens in the colour of the upper parts; wing ♂, 256. ♀, 280 mm.; European birds vary a good deal in the depth of colour of the mantle and in length of wing. Buturlin's race *centralasiæ* from Tian-shan wants further examination; it seems a little doubtful.

163. Merlin Falco æsalon.

1. *Falco æsalon pallidus* (Suschk.) (Bull. B. O. C. 11, p. 5, 1900—W. Kirghis steppes).
2. *Falco æsalon insignis*, Clark. (Proc. U. S. Nat. Mus. 32, p. 470, 1907—Fusan in Korea).

The Merlin, of which two races occur in Mesopotamia, is a winter visitor in small numbers; the earliest date of arrival is September 24th and the last date May 5th. It is distributed throughout our area hunting in open spaces, particularly crops, for Crested Larks and such small birds.

Three skins examined: (1) ♀, Amara, 23-1-18 (P. A. B.); ♂ Amara, 13-3-19 (Aldworth).

These two belong to the very pale form *pallidus*, the adult of this race is a most beautiful pale blue grey above, shades paler than the west European form; the young are also a much paler rufous brown.

Wings, 207. ♀ 231 mm.

(2) Khamiseyah, 25-11-16 (Aldworth).

This is not as pale as *pallidus* and yet it is paler than the west European bird, and matches well examples of *insignis* from Turkestan and China. Wing 204 mm.

164. Lesser Kestrel. Falco naumanni.

Falco naumanni naumanni, Fleischer (Sylvan, 1818, p. 174—S. Germany).

Fairly common summer visitor and passage migrant; Buxton says it passes through Amara during the last three weeks of April; Pitman at Feluja noted flocks passing over at intervals from April 8th, twenty to thirty birds in a flock; while on May 5th he saw numbers of what he thought were this species nesting in an elevated ruin 10 miles south of Feluja. Weigold records it as a very common and breeding at Urfa, and Sassi notes it at Mosul on May 2nd. There are no autumn records, except at Baghdad in the first 10 days of October.

Seven specimens examined: ♂ ♀, Amara, 23-4-18; Baghdad, ♂, 11-10-17 (P. A. B.); Feluja, ♀, 8-4-17; ♀, 9-4-17 (two) ♂, 16-4-17 (C. R. P.).

165. Common Kestrel. Falco tinnunculus.

Falco tinnunculus tinnunculus, L. (Syst. Nat. Ed. x., 1, p. 90, 1758—Sweden).

As far as can be ascertained the Kesrrel is resident in Mesopotamia, breeding at all events from Mosul south to the Babylon district, and in the Karun foothills, spreading out in winter over the rest of the country and perhaps augmented by

winter visitors from elsewhere. In the cliffs bordering the upper parts of the Tigris from Fatah Gorge to the Samarra district and on the Euphrates near Feluja, it is reported as being an abundant breeding species; elsewhere ruins are occupied and at Museyib Livesay found two nests containing 7 eggs each, in each case an old Magpie's nest being utilized. Pitman records that they were pairing off at the end of February at Samarra where every ruin had its pair; he found a nest of young in the middle of a Roller colony at Feluja on May 25th. Logan Home found eggs at Tekrit between April 4th and May 15th.

From Baghdad and Babylon southwards it appears to be a winter visitor as we have no nesting records; Buxton at Amara says it arrives at the end of September and leaves by the first week in April. In the Shustar district however it is a breeding species.

Nine skins examined: ♂, Bait-al-Khalifa, 30-1-18; ♀, Adhaim, 4-11-17 (C. R. P.); ♂, Baghdad, 14-1-19; Amara, 21-12-17; Sheik Saad, 22-3-17 (P. Z. C. and R. E. C.); ♂, Amara, 1-11-17, 29-10-17, 23-12-17 (P. A. B); ♂, Hit, 7-4-18 (Ludlow).

Wings ♂ 230-250. ♀ 247-271 mm.

These agree well with European birds, whose mantles vary much in shade of colour.

166. Imperial Eagle. Aquila heliaca.

Aquila heliaca heliaca, Sav. (Desc. Egypte. Syst. Ois., p. 82, 1809—Upper Egypt).

Very few Eagles of any sort were obtained and many records of various Eagles have had to be omitted as being unreliable as to the species. Eagles are not uncommon in Mesopotamia, all, except Bonelli's and the White-tailed, being, so far as we know, winter visitants.

The Imperial Eagle is recorded by Mr. Donald twice in October near Basra and once near Sheik Saad where he saw one stooping at a hare. Logan Home noted it near Gurmat Ali on August 8th. Zarudny records it in winter in the Karun district; Meinerzhagen records it from the Tigris in winter. Cheesman obtained one at Beled on March 4th; it had been feeding on stale sheep's "lights".

167 Tawny Eagle. Aquila rapax.

Aquila rapax albicans, Rüpp. (Neue Wirbelt. Vög., p. 34, 1835—Simen Prov. in Abyssinia).

There are no records which can safely be put down to this species; perhaps it is not uncommon as Pitman obtained one at Kut and Logan Home one at Basra. Wings 520 and 525 mm. Mr. W. L. Sclater, who has recently been working at this group, kindly identified these for me as belonging to this race.

168. Steppe Eagle. Aquila nipalensis.

Aquila nipalensis orientalis, Cab. (J. F. O., 1854, p. 369—Volga).

Fairly common winter visitor in the marshes round Amara and presumably elsewhere; last seen April 7th. Mr. Donald records seeing one rob a Saker of a Sand-grouse. Buxton obtained one at Kurna on March 17th, 1918, and Cheesman got one, sitting on a desert mound at Beled, on March 1st, 1919, it had been feeding on stale chicken; another near Zoar on April 30th, where he saw two pairs. Zarudny records both this, the western race, and the eastern typical race *nipalensis* from the Karun district in winter as well as a race, *glitszhi*, which according to Hartert is a synonym of *orientalis*.

I am indebted to Mr. Sclater for identifying these two specimens.

169. Greater Spotted Eagle. Aquila maculata.

Aquila maculata (Gm.) (Syst. Nat. I, i, p. 258, 1788—Europe).

One recorded at Basra by Mr. Donald at the end of November, and one seen at close quarters at Amara by Buxton on November 2nd. One was obtained at Baghdad on December 28th by Cheesman.

Meinerzahagen records it from the marshes near Kurna and at Tekrit. Probably not uncommon. Cumming obtained one at Fao and there are three specimens in the B. M. from Baghdad collected by Loftus.

170. Golden Eagle. Aquila chrysaëtus.

Zarudny records the Golden Eagle, under the name of *fulva*, from the Karun district in winter and says it nests in small numbers in the Zagros. No other records.

171. Bonelli's Eagle. Hieraetus fasciatus.

Hieraëtus fasciatus fasciatus (Vieill.) (Mem. Soc. Linn. Paris 2, 2 p. 152, 1822—Montpellier in S. France).

Bonelli's Eagle appears to be fairly common and resident in at all events the Tekrit area; probably it spreads out in winter to other parts of the plain. Aldworth found four or five pairs breeding within a range of twenty miles in the Tekrit area. The first nest contained a single egg on February 19th, the nest placed on a cliff, and built of sticks was very flat, like a huge Sparrow Hawk's nest, except that it was lined with grass. Nearly three weeks later a second egg was taken from the same nest. A second nest in the area contained two eggs on March 12th ; the female was shot for identification. Zarudny lists it for the Karun district in winter. Meinerzhagen says the Arabs prize it for gazelle hawking.

172. Booted Eagle. Hieraëtus pennatus.

Hieraëtus pennatus (Gm.) (Syst. Nat. I, i, p. 272, 1788—France ?).

Weigold records this as the commonest large bird of prey at Urfa and several observers thought they saw it commonly in our area. No skins obtained, but there are three from Fao in the British Museum obtained by Cumming.

173. Sea Eagle. Haliaëtus albicilla.

Haliaëtus albicilla (L.) (Syst Nat. Ed. x, 1, p. 89, 1758—Sweden).

This fine Eagle is resident and breeds in the Tekrit area and is not uncommon ; to the rest of the Mesopotamian rivers and inundations it wanders in winter. Aldworth found three pairs breeding in the cliffs at Tekrit by the river. The first nest held two eggs on January 28th ; another nest had two hard set eggs on February 3rd, and the third two fresh eggs on February 8th ; these nests were all in caves in the face of the cliffs about 30 to 50 feet from the top and were lined with tufts of grass. The bird whose egg was taken on January 28th was sitting again on March 1st. An old female shot from the nest had the whole bill *yellow ;* iris pale yellow ; tarsi pale, bright yellow.

This Eagle also breeds at Birejik on the Euphrates beyond our area, whence, Mr. Parkin has a clutch of three eggs.

174. Pallas' Fish Eagle. Haliaetus leucoryphus.

Haliaëtus leucoryphus (Pall.) (Reise. d. versch. Prov. Russ. Reichs I, p. 454, 1771—S. Russia).

Several observers recorded single birds over the rivers and inundations during the winter. Zarudny also records it in winter.

No skins obtained.

175. Steppe Buzzard. Buteo buteo.

Buteo buteo anceps, Brehm. (=*desertorum* auct.) (Naumannia, 1855 p. 6—Blue Nile).

Observed by Cumming at Fao as a passage migrant and winter visitor, he obtained three specimens in the first fortnight of September when they were passing in great numbers.

No specimens were obtained by any of our observers and therefore statements concerning its presence in winter need verification.

Weigold obtained one at Djullab on April 23rd and Neumann records one from Ras-el-Ain on July 30th, and remarks on the coloration of the tail of this specimen which, instead of being red-brown, was iron grey with nine sharp black cross bands. From the date it was obtained he says it must have bred there, an assumption I consider entirely unwarrantable, as the date is not too early for odd migrants (see under Black Kite) or indeed it may have been a non-breeding individual; were one to accept the presence of a single bird of any species at the end of July as evidence of that species breeding in the locality, some very curious and very erroneous statements would occur in Ornithology.

The status of this Buzzard in Mesopotamia requires further investigation.

176. Long-legged Buzzard. Buteo ferox. "Nisr."

Buteo ferox ferox (Gm.) (Nov. Comm. Acad. Petropol. 15, p. 442, 1771—Astrachan).

In most parts this Buzzard is a common winter visitor arriving at the end of October and leaving again at the end of March. It should be familiar to most by its great diversity of plumage and its habit of perching on any upstanding thing such as a telegraph post, old wall, brick-kiln, etc., but many of the records have unfortunately to be discarded as they were evidently mixed up with other species. It seems certain that this species nests in the Tekrit area where Cheesman found a nest in the cliffs; Logan Home also records a pair nesting there at the end of March, when he obtained a clutch of two eggs and saw several pairs building at the end of February.

Cheesman obtained one at Hindia Barrage on March 22nd with organs advanced. Sassi records it from Mosul on June 2nd.

Nine specimens examined :—♂, Samarra, 20-2-19; ♂, Amara, 4-12-17; ♂, Hindia Barrage, 22-3-19 (P. Z. C. and R. E. C.); ♀, Legait, 28-11-16 (Livesay), Sheik Saad, 12-17 (Ingoldby); Kut, 27-10-16 (C. R. P.); ♀, Amara, 13-1-18; ♂ ♀, Ezra's Tomb, 23-2-18 (P. A. B.).

177. Pallid Harrier. Circus macrourus.

Circus macrourus (Gm.) (Nov. Comm. Acad. Petropol., 15, 1770, p. 439, 1771—Voronez in Russia).

A common winter visitor throughout our area; first noted on September 12th but most arrive in October; the majority leave during March but there are records up to April 13th. It is found wherever suitable country occurs such as scrub, grassy plains, crops, etc. Brooking records it taking a "Paddy Bird" at Ramadi and, more than once, Pigeons of the Carrier Service. Sassi records it at Mosul on April 25th and Neumann from Ras-el-Ain as early as August 8th.

Six specimens examined :—♂, Amara, 14-2-18; Sheik Saad, 8-12-16 (P.Z.C. and R. E. C.); ♂, Amara, 1-17; Kumait, 2-17 (P. A. B.); Mesopotamia (Perreau), Kut, 6-1-17 (C. R. P.).

178. Montagu's Harrier. Circus cineraceus

Circus cineraceus (Mont.) (Orn. Dict., 1802—Wiltshire).

Various other Harriers are recorded as being observed such as *cyaneus*, which may occur, and *melanoleucus* which is unlikely to; however it seems almost certain that Montagu's Harrier does occur, Zarudny records it in winter in the Karun district and several of our observers record it, noting that its appearance and disappearance and habits are much the same as those of the Pallid Harrier. No skins however were obtained.

I hesitate to include the Hen Harrier as I am very doubtful if one can be certain of it on the wing and the Pallid Harrier is so common. Several observers state they saw it in winter, but no specimens are forthcoming.

It is possible a Harrier of sorts breeds in the Tekrit area as Logan Home records one (under *cyaneus*) as common from April to June at Samarra, and remarks that it must be breeding. The status of the various Harriers requires further investigation.

179. Marsh Harrier. Circus æruginosus.

Circus æruginosus æruginosus (L.) (Syst. Nat. Ed. x, 1, p. 91, 1758—Sweden).

The Marsh Harrier is very abundant and resident in the huge marshes of the plains, such as the Euphrates marshes near the Hindia Barrage, and the Hamar lake and elsewhere. Logan Home noted it also in the Samarra district in April to June wherever there was long lank grass. In the marshes near Basra, where it also breeds, it was observed building on March 22nd and Buxton also saw it carrying, as nest material, pieces of reed at the Hamar lake on May 25th. Five nests were found by Livesay in the Hindia marshes on June 2nd containing two eggs (two); three eggs, and two with young.

Nine skins examined :—♂, Amara, 11-2-18, ♀, 16-12-17, 7-2-18, 17-2-18, ♂, Baghdad, 31-3-18, ♀, L. Akkarkuf, 12-10-17 (two) (P. A. B.). Amara 16-1-18 (P. Z. C. and R. E. C.); L. Akkarkuf, 18-8-17 (C. R. P.).

These agree well with European specimens; they are not glossy or nearly black on the upper parts as in the Algerian form *harterti*; the coloration of the crown varies, in October it is rusty cream to creamy white, in February dirty white. Naumann was inclined to think that one he examined from Ras-el-Ain might be *harterti* as it had a pure white crown and the mantle somewhat darker than in European birds; I can however not see any difference between this series of Mesopotamian birds and European ones.

Two of Buxton's are adult males with streaked heads and silvery blue on wings and tail. A female, he noted, had a double ovary.

180. Sparrow Hawk. Accipiter nisus.

1. *Accipiter nisus nisus* (L). (Syst. Nat. Ed. x, 1, p. 92, 1758—Sweden).
2. *Accipiter nisus nisosimilis* (Tick.) (J. A. S. B., ii, p. 571, 1833-4—Borabhum, India).

Fairly common winter visitor, recorded throughout the area, it arrives at the end of October and most have gone by the end of March. Pitman records it from Feluja on April 17th and Sassi at Mosul on the 27th; Pitman says he saw it in the date groves at Museyib in June and July and supposed it was breeding; this record as in the case of the Hobby, needs further confirmation, but it seems probable that some small hawk must nest there. Brooking has recorded that this species breeds at Ramadi.

(1) Seven skins examined : ♀, Amara, 25-1-18, 1-12-17, ♂, 23-11-17 (P. A. B.); ♀, Abed. 9-2-18 (F .M. B.); ♀, Feluja, 17-4-17; (two) ♂, Amara, 4-2-18 (P. Z. C. and R. E. C.)

Wings ♂, 201, 201, ♀, 227-239; I cannot separate any of these on colour, and their wings fall within the measurements of the typical race.

(2) ♀, Amara, 3-3-18 (P. A. B.); ♀ Samarra, 29-1-18.

These two specimens with wings of 243 and 246 mm. are much larger than any of a large series of European birds I have measured and must I think be assigned to this widely distributed eastern race. Probably in small numbers a winter visitor.

181. Levant Sparrow Hawk. Accipiter brevipes.

Accipiter brevipes (Severtz.) (Bull. Soc. Imp. Nat. Moscow, 23, 2, p. 234, 1850—Voronesh, S. Russia).

Recorded as seen almost daily in April at Urfa at Weigold. Zarudny gives it as a winter visitor and passage migrant. It must occur faitly commonly, but we have no records or specimens.

182. Black Kite. Milvus migrans.

Milvus migrans migrans, Bodd. (Tabl. Pl. Enl., p. 28, 1783—France).

A winter visitor to the plains, arriving early ; the earliest record is July 26th near Baghdad and but few are seen till mid-August when they appear in some places in numbers; many are recorded at Fao on the 18th, Basra on the 20th ; to some places no great numbers are seen till well on in September as at Baghdad, while throughout the country they become increasingly common during October and remain common during the winter. They begin to leave again in March and few are left by mid-April ; odd non-breeding birds are recorded on June 1st.

Weigold records it as common and breeding at Djullab on the Syrian frontier (or actually in Syria ?). Cheesman saw a large flock roosting in date palms at Khanikin on the Persian frontier on May 21st but its status there is not known.

Attracted by food it swarmed round the larger camps and even followed troops on manœuvres and is very common in the larger towns, as at Basra, where it competed with the gulls in scavenging the river for floating morsels. There is no truth, of course, in the widespread idea held during the war that the kites were imported from India to act as scavengers ! It was remarked that these kites were commoner in 1917-18 than in 1916-17, probably due to the increased number and extent of camps, dumps, etc. Several were killed by anti-aircraft fire. Stoneham records it roosting on bare ground in lieu of trees.

Six specimens examined : ♂, Shaiba n. d., ♀, Sheik Saad, 1-11-16, 14-9-16 (P. Z. C. and R. E. C.); ♀ Sheik Saad, 12-12-17 (Robinson). ♀, Baghdad, 13-9-17; ♂, Qizil Robat, 22-11-18 (P. A. B.).

These match European birds in similar plumage ; the edging to the crown feathers not rufous, but creamy white.

The name *Korschun* of Gmelin has been resuscitated of recent years by some authors for this bird, but this name is invalid, as pointed out by Newton many years ago. It seems a pity that, before old names are brought forward to replace well known names on the plea of priority, their correctness is not more carefully gone into.

183. Large Black Kite. Milvus lineatus.

Milvus lineatus, Gray (Hardwicke's Ill. Zool. I, p. 1, 1832—China).

The status of this bird, except that it is presumably a winter visitor, is not known. Zarudny records it as rare in winter in the Karun district. Buxton obtained a pair on December 25th, 1917, which I regard as belonging to this species ; the black streaks on the crown are not edged with creamy white but with rufous brown, as in *govinda*, they are also large birds (wings ♂ 455 ♀ 485 mm.) and there is a considerable white patch at the bases of the flight feathers. Possibly it is commoner than the records indicate but was confused with *migrans*.

This bird is the *Milvus melanotis* of the Fauna of British India.

184 Red Kite. Milvus milvus.

Milvus milvus milvus (L.) (Syst. Nat. Ed. x, 1, p. 89, 1758—Sweden).

Recorded by Zarudny as a passage migrant in the Karun district. No other records.

185. Honey Buzzard. Pernis apivorus.

Pernis apivorus apivorus (L.) (Syst. Nat. Ed. x, 1758—Sweden).

Apparently a passage migrant and not common. Cumming obtained specimens at Fao on September 22nd, 1884, and September 23rd, 1886. These are in the British Museum.

186. Osprey. Pandion haliaetus.

Pandion haliaëtus (L.) (Syst. Nat. Ed. x, 1, p. 91, 1758—Sweden).

A winter visitor to the larger rivers and swamps of the plains where it is not very uncommon. Single birds are recorded on May 18th and July 5th but there is no evidence that it breeds in our area ; as elsewhere doubtless a few non-breeding birds spend the summer. It breeds on the island of Tanb in the Persian Gulf, though of course this is nowhere near Mesopotamia.

Cheesman obtained one at Shaiba oasis, 8 miles from the nearest water, it had frequented a tall pole for roosting on for some time. Buxton got one at the Hamar lake on May 20th.

187. Griffon Vulture. Gyps fulvus.

Gyps fulvus fulvus (Habl.) (Neue Nerdische Beytr. iv, p. 58, 1783—Gilan, Prov. of Persia).

A non-breeding visitor to the plains in small numbers and widely distributed.

This is the big dark Vulture recorded by many observers ; small parties were generally met with feeding at some dead animal, or roosting on the tops of palm trees. It probably breeds in the hills of Kurdistan and may do so in the Jebel Hamrin; Logan Home thought it might even breed in the cliffs of Tekrit but, we have no definite evidence of it. Zarudny says it is resident in the Zagros and breeds also in the Karun area. It appeared to be commoner in the parts nearer the foot hills, as in the Samarra-Tekrit area, than away in the plains lower down. It is recorded in most months of the year and probably some non-breeding birds spend the breeding season in the plains.

Many were seen haunting the old battlefields round Azizieh and parties of 20 to 50 are noted at other places attracted by dead animals, such as at veterinary dumps.

Specimen examined : One skin : July 1917 Kanikin (P. A. B.)

(Pitman on several occasions at Samarra and below Baghdad on the Tigris thought he saw *monachus*, the King Vulture, but further confirmation is advisable, though it is likely to occur.)

188. Lämmergeier. Gypaetus barbatus.

Magrath records that he saw an undoubted Lammergeier near Ali Gharbi on May 16th and remarks that the Jebel Hamrin range is but 20 miles from there, whence presumably the bird had come, or more probably from the Pusht-i-Kuh Mts. distant about 35 miles in direct flight. Weigold also records a straggler at Urfa on April 20th, which must have wandered still further from its home.

The race inhabiting Kurdistan is presumably *grandis*.

189. Egyptian Vulture. Neophron percnopterus.

Neophron percnopterus percnopterus (L.) (Syst. Nat. Ed. x, 1, p. 87, 1785—(Egypt).

It is somewhat surprising that Vultures should be so scarce in Mesopotamia considering the plentiful supply of dead animals there was during the war, and it would seem that no increased numbers were induced to visit the country on this account, quite the reverse to the experiences of earlier Afghan campaigns when species such as *Pseudogyps bengalensis*, not usually found in Afghanistan followed the armies hundreds of miles away from their normal habitat.

This vulture, the least rare of those which occur, cannot be said to be really common anywhere ; it is resident, or practically so, breeding in the Jebel Hamrin range ; some move down to the plains in the non-breeding season and others remain in the plains all the year as non-breeding birds. It is widely distributed in quite small numbers, single birds or twos and threes being the usual thing.

Tomlinson records it as common at Ahwaz where he found three nests in April ; Cheesman found it nesting on a ledge of a cave at the Maidan-i-Naptun oil-fields on Monday 20th.

(*To be continued.*)

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, MAR. 25, 1922.]

NOTES ON MESOPOTAMIAN MAMMALS

BY

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Having read the report on the Mammals of Mesopotamia in Journal Vol. XXVII, No. 2, I have realised that I have a good many Field Notes on the Mammals of that country, which may be of some value, as I served there from January 1916 until April 1918. I was principally on the Tigris, from Basra to Daur (15 miles upstream of Samarra), with a brief interval on the Euphrates at Feluja and the Hindiyeh Barrage from the middle of March 1917 until the middle of July that year.

PACHYURA ETRUSCA—*Pigmy Shrew*—All the records mentioned are from the Tigris. The only one I came across was at the end of March 1917 when my Regiment had just arrived at Feluja on the Euphrates. One afternoon while we were sitting in the Mess Tent, which had been dug down into the ground, a minute shrew with body no bigger than that of a bumble bee, suddenly appeared on the table, and was running about for several minutes; and although once actually imprisoned under an inverted tumbler by one of my brother officers, I failed to secure it as a specimen.

HEMIECHINUS AURITUS—*Long-eared Hedgehog.*—Again I note that all the specimens recorded are from the Tigris, though Ludlow recorded this species as plentiful at Hit, R. Euphrates. Most of my acquaintance with these animals was at Feluja on the banks of the Euphrates during March and April 1917, when I found them very common.

I kept alive all the specimens that were brought to me and for their prison dug a pit into the stiff soil, which measured 5 feet in diameter and had vertical sides nearly 4 feet in height.

At the bottom of this pit the various Hedgehog inhabitants excavated burrows on the same level as the bottom, but which had a tendency to turn upwards.

However none of the little prisoners ever escaped by digging right up to the surface, and in fact never even got as far as anywhere near it.

A pair were my first capture and they soon dug themselves in, once they were placed in the pit; the usual length of burrows they excavated was 2 to 3 feet.

I then obtained 4 youngsters a fortnight old, which apparently cried so much their first night in the pit, that two more adults, who may have been the parents, were attracted by the noise and fell in. Those youngsters never managed to dig more than a few inches into the ground. At night they were all very active and I used to watch their antics and see them feed, with the aid of an electric torch which did not seem to frighten them in the least. I fed them on bread and watered milk, raw potatoes, carrots, cucumber and other vegetables, as well as dried gram, lentils, dhal and crushed barley.

With the exception of one of the youngsters which died, they all flourished and soon became quite tame, though they kept to their burrows during the day.

I eventually let them all go, as there was a difficulty of making up and storing the skins.

As all my notes are not handy at the present moment, I cannot say where else I came across this species in Mesopotamia. although I know that I have other records which include the note of a drowned specimen found near Samarra in February 1918.

FELIS CHAUS—*Jungle Cat.*—One day in January 1916, shortly after my arrival in Mesopotamia and while on the march up the Tigris between Kurna and Ezra's Tomb, I came across one of these animals, while out small game shooting, in thick cover on the river bank in the late afternoon.

Some of my scouts told me that a Jackal was crouching in a bush and that they would catch it for me.

This they proceeded to do and after a short though fierce struggle, they emerged scratched but triumphant with the biggest and most hideous type of wild cat I have ever seen. It really was a magnificent creature, considerably larger than a Jackal and standing as it did a deal higher. In colour it was a pale, though bright brownish orange or ginger, with rich reddish brown and chestnut stripes. The beast was well secured with cloths and straps, and I had intended trying to keep it alive, but unfortunately it escaped on the way back to camp. I subsequently saw other though much smaller specimens whilst shooting in the thick cover on the banks of the Tigris and R. Adhaim at various points as far North as Daur, but failed to secure any specimens.

From March to July 1917, while on the Euphrates at Feluja and the Hindiyeh Barrage, I did not come across this species but the country that I traversed in those parts was not suitable, and thick cover was rarely visited as it was the close season for small game shooting.

In early March 1917, while shooting Hares and Black Partridge in scrub cover on the Tigris banks between Kut and Baghdad I saw a smaller type of wild cat, a greyish buff in colour and spotted blackish, at which I could not get a shot.

HERPESTES PERSICUS—*The Persian Mongoose*—Noted principally in the Palm Groves in the vicinity of the cities of Busra, Amarah, and Baghdad on the Tigris. No specimens were secured and no type of ICHNEUMON ever noted. Without my notes I cannot for certain say whether I have many records of the Mongoose, from the Euphrates, but there were a lot in scrub by a palm grove near the Hindiyeh barrage, where I found a clutch of Marbled duck's eggs they had consumed.

HYÆNA HYÆNA—*The Striped Hyœna.*—When at Feluja on the R. Euphrates in March, April and May 1917, I knew of the same collection of Hyæna Earths which Ludlow mentions. They were situated a few miles north of the town in a group of low marl and gypsm mounds not very far from the river, and which actually formed a portion of the ruins of the ancient Persian fortress of Anbar, but I never came across the owner. In the broken country near the Tigris, where it is joined by the Shatt-el-Adhaim, this hyæna was quite common during October and November 1917, and on more than one occasion they were caught in the open by our pig-sticking enthusiasts and hunted for miles, but they were practically impossible to overtake even in the open country.

I often saw them out on the elevated plain above the river soon after dawn and watched them return to the broken ground, and during some manœuvres one day we put one up in broken country as late as 11-0 in the morning. In this same area a sepoy who went off his head and wandered out into the desert and shot himself, was eaten by hyænas, who just left the skull and a few bones.

Some of our advanced posts in the broken and elevated country on either side of the Adhaim were much worried nightly by these beasts who stole many a live sheep and, though shot at, always got away unscathed with their prey.

While in camp at Bait-al-khalifa from November 1917 till March 1918, traces of hyæna were to be found everywhere in the broken country, ancient ruins and in the steep banks of the huge and ancient Nahrwan Canal, from the R. Adhaim to Daur which was as far North as I ever went. Reports of these being seen on both banks of the Tigris in those parts by reliable observers were quite frequent, though I never actually saw any myself.

CANIS AUREUS—*The Jackal.*—There is little for me to say about this species which I found exceedingly common both on the Tigris and Euphrates, wherever I happened to be in camp from 1916 to 1918. I have no special notes on their habits, except that I found them breeding freely in holes and mounds along the banks of the Magasis and other canals just down stream of Kut-el-Amarah, on the right bank of the Tigris during June 1916, when numerous litters of 5 or 6 cubs had just been born and the camps were full of youngsters kept by the

men as pets. Any scrub cover near the rivers and marshes, as well as the gardens and cover in the vicinity of towns simply swarmed with jackals.

VULPES PERSICA—*Persian Desert Fox.*—A very attractive and elegant little creature, that I was always attempting to bring to bag, though I but rarely succeeded. It seemed quite common wherever there were mounds, ancient tumuli and canal banks, etc., and was found to be very plentiful in broken country which was really suitable, such as in the vicinity of the Shatt-el-Adhaim. Being nocturnal in habits one rarely saw them except in the early morning or just before dark, though I have frequently caught them sunning themselves just outside their earths during the middle of the day. Whereas the jackal often had no alternative bolt holes, this species usually provides itself with one or more. The best way to secure specimens was to lie up over an earth in the evening and wait for them to emerge or try and catch the night reveller on his homeward journey in the early morning and even then unless shot at close quarters they frequently got in to their earths before dying.

LUTRA LUTRA—*Common Otter.*—This was an animal that I was particularly anxious to secure in Mesopotamia, but I never even saw one, though I came across their traces in the Tigris near the R. Adhaim in September, October, 1917, and in the Euphrates and marshes in the vicinity of the Hindiyeh Barrage during June and July of the same year.

JACULUS LOFTUSI—*Loftus Jerboa.*—During June and July 1916 I found this species very common indeed on the bare " pat " plains near SHEIKH SAAD on the Tigris, where we had one camp. Absolutely nocturnal in habits, they puzzled our dogs tremendously and I never saw them get caught by a dog—in fact I have frequently seen these little Jerboas leap right over their canine pursuers. Their earths go steeply into the ground for 2 or 3 feet and the little creatures evidently lie up all day in the cool, damp earth as I always noticed that captive specimens, of which we tried to keep many from time to time, suffered tremendously from the great heat during the day, even when kept in the coolest of places dug right into the grounds, so much so that we never managed to keep any alive for more than a few days. They used to eat a certain amount of grain and crushed barley. They stopped the mouths of their earths by day and came out at dusk. Occupied earths during the day were easily distinguishable by the numerous foot prints made the previous night and one only had to pour a little water down the hole to flood out the owner, who was at once bagged on appearing outside his earth. To see dozens of white tail tips moving about jerkily in the dusk was really quite uncanny.

I also came across them less plentifully on the Euphrates at Feluja (March-April —May 1917), Euphrates Barrage (June-July 1917), near Baghdad (August September 1917) and near R. Adhaim (September-October 1917). I believe this species hibernates to a great extent during the winter months and heavy rains but do not know whether they seal up the entrances of their burrows to keep out the torrential rains.

N.B.—After writing my notes about JACULUS LOFTUSI, I re-read the B. N. H. S. Journal's introductory note and find that Mesopotamian specimens had only been taken on the Euphrates side. The animals to which I refer are the " Jumping Jerboas " and which I made no mistake about in each instance.

TATERA BAILWARDI—*Bailward's Gerbil.*—There is little that I know of this species except that they were common in a colony in damp ground at the edge of L. Akkarkuf near Baghdad in July-August-September 1917. I used to catch them by flooding out their holes, but it was not too easy and I think their burrows go fairly deep and long, also as far as I can remember these earths did not have the entrances stopped with earth as in the case of *Nesokia* and *Jaculus*, but here I am open to correction. They used to come out in daylight both in the early morning and evenings and travelled over a good deal of ground

during the night. I used to shoot them with a ·22 bore when they came out of an evening.

NESOKIA BUXTONI—*Buxton's Mole Rat.*—I have little to add to Buxton's remarks, all of which apply to my own experience of these animals. My specimens were secured out of a colony who had their burrows on the foreshore of L. Akkalkuf-Baghdad. I frequently saw them excavating during the day in July and August, and used to shoot specimens with a ·22 bore in the evening when they came half out of their burrows in the broad daylight, after I had removed the loose earth from the entrances.

MUS GENTILIS—*House Mouse.*—Swarmed everywhere and in the vicinity of camps and supply dumps multiplied exceedingly and very swiftly. Undoubtedly there were plenty present in the country originally, in the vicinity of towns and Arab villages, but I am certain that any quantity were introduced amongst the grain sacks and fodder, as well as the wooden cases of provisions, which were a part of the army's supplies. It was quite extraordinary the way in which a camp or supply dump would be formed in the barren desert, and within a week the place would be swarming with mice, as well as with large flocks of *Passer domesticus.* I shot many in my dug-out tent in various camps, but never kept any of the skins or skulls.

ACANTHION (Sp.)—*Porcupine.*—I found this animal quite common in the broken country on either side of the Shatt-el-Adhaim during September-October and November 1917, but being entirely nocturnal I could never secure a specimen, as the earths were a long way in front of our night picquet line, and also were driven into the sides of rocky mounds and the base of cliffs, and in consequence were quite impossible to dig out. In November and December of that year and in January and February 1918, I came across numerous earths in the ancient ruins and steep banks of old canals all along the Tigris from the Adhaim to Daur (15 miles North of Samarra) and there were at least half-a-dozen earths in the vicinity of our camp at Bait-al-Khalifa. All but one of these were quite impossible to dig into and sitting up and waiting for the inhabitants to emerge on the bitterly cold nights of the Samarra winter did not attract me, especially as one could not have been certain of getting a shot as the animals did not come out every night.

However, I did try and dig out an earth which went deep into the ground amongst hard stony ruins and lumps of gypsum and after two days hard work captured the owners who were rather badly mauled in the process. I have already described, in a recent number of B. N. H. S. Journal, the method by which one of these captured, and no doubt terrified, beasts gave me an extraordinarily powerful blow on the leg. The ♀ which was the bigger of the pair weighed 25 lbs. and the ♂ 23 lbs., these weights being taken as they lay directly after they had been killed. We ate them both and they were excellent. In the Adhaim area they used to come down and drink in the pools left in the otherwise dry bed of the river; near BAIT-AL-KHALIFA there was no water at all available for them, except the nightly dew or when rain fell. From my observations it appeared that these animals partially hibernate during the winter and most certainly do not leave their burrows every night. There are usually several entrances to one burrow, but as they are all quite close to each other, they can hardly be regarded as bolt holes such as are usually utilized by Foxes.

LEPUS DAYANUS CONNORI—*Connor's Hare*—I found this species very common wherever there was dry cover all along the Tigris as far North as Daur and on the Euphrates from Feluja to Hit, the only area in which I served on the latter river. They provided excellent sport if one had a gun and many were brought to bag during January 1916 when my Regiment was marching up the Tigris to the Kut relief operations.

A close season was eventually instituted and I think these animals were pro-

tected from March till end of August. I came across young ones in April as well as in July. The following bags may be interesting :—

3-12-16 ..	..Near Kut el-Amarah	.. 2
10-11-13-1-17 ..	do.	.. 4
19-20-24-2-17 ..	do.	.. 6
4-3-17 ..	..Near Aziziyeh (R. Tigris)	.. 5
2-3-7-17 ..	..Euphrates Barrage (Shot as N. H. Specimens)	.. 5
27-30-9-17	..Shatr-el-Adhaim	.. 3
6-7-10-16-10-17 ..	do.	.. 4

On 4th February 1918 near Samarra while on the march 3 hares broke through our column and a sepoy killed one with the butt of his rifle. This specimen I sent the B. N. H. S. and at the time I noted that it was very rufous on the flanks and had fine thick fur.

It was a very common occurrence when on the line of march for the protecting troops on the flanks to put up numerous hares which invariably became completely bewildered and charged through the marching column. I frequently noticed that when hares ran off across the open plain, they always lay up in the first piece of cover, however small, or in a small ditch, nullah or broken piece of ground where they could be at once followed up and brought to bag. Often one tiny patch of open scrubby cover near the river would contain the best part of a dozen hares. In very thick cover they were scarce.

FELIS CARACAL.—*The Caracal.*—I never saw any species of this animal in Mesopotamia, but while in camp at Bait-al-khalifa, Samarra—a bit of a naturalist amongst our Cis-frontier Pathans described an animal to me which fitted in with the description of a Lynx or CARACAL, and which he said lived in a den leading off a deep hole amongst the ruins, and he used to sit up by night and try and shoot it. An animal of sorts did live there, but I am quite sure it was not a Caracal, as the only food supply near by was one covey of see-see.

The only Caracal I shot in India was on the Indus near Dera Ismail Khan. It was put up in thick cover where small game was abundant.

GAZELLA MARICA.—*The Marica Gazelle.*—As far as I can remember, not having my complete diaries handy, I first of all came across a Gazelle in Mesopotamia in the area between Baghdad on the Tigris and Feluja on the Euphrates, in the middle of March 1917, but as I never secured any specimens I can offer no remarks on their size, markings, or type of horns. Gazelle were also very plentiful near Feluja, but west of the Euphrates, and evidently dropped their young during April and early May, at which season the Arabs used to bring dozens round our camps to sell to the troops as pets. As far as I could make out, single youngsters were just as common as pairs. Out of a couple of dozen that I tried to bring up with the aid of goats only two survived for any length of time, and in fact I don't think more than half-a-dozen was successfully reared in the whole brigade.

A large number died because they were brought in too young, and we eventually discovered that the only hope of saving the youngsters was to turn them loose with the foster mother and leave them to look after themselves entirely. They began to graze very soon after they were born and quickly became exceedingly tame. They strayed far when feeding, but a whistle would bring them galloping and bounding in at once. To me, what was a most extraordinary thing, was the way the little beggars swim. Two, that a Subadar of mine had successfully reared, were out grazing near one of our posts which protected a bridge over a large irrigation canal. The two Gazelle, who were then possibly 6 weeks' old, were feeding on the other side of the canal, which had steep banks over 30 feet high, with a perpendicular drop of a few feet at the bottom and was 40 to 50 feet wide and about 10 feet deep. The Subadar whistled, and the little beggars unhesitatingly plunged into the stream and swam across swiftly with the greatest of ease ! I was absolutely amazed at the performance. The little buck died of some disease in the head or perhaps from some animals getting into the brain

through the ears, when he was 2 months' old, but I saved the doe, who became very tame and made a charming pet, until she eventually died in Palestine in October 1918, after I had her nearly 18 months. They grazed freely on almost all desert grasses and herbage, this being their staple food, but they also liked crushed barley, gram and dhall, as well as dried fruits, dates and sugar. Both when young and full grown they uttered a peculiar gutteral grunt, like a very bass and throaty " ba-a " but clipped short. The Arabs told me that the does always came in from the desert to drop their young in the cover and seclusion of the spring crops near the river, and that was why they caught such large quantities of the youngsters.

The young become very fleet of foot within a few days of being born, and then are almost impossible to catch. In February 1918 when my doe was nearly a year old, she was chased the best part of 10 miles out of camp by a couple of Suigis (Persian Grey hounds). This was at 2-30 in the afternoon ; and at 7-30 the next morning she returned furtively to the camp, found my tiny tent and tucked herself away in a corner under the bed for the rest of the day ! Once when I had been away for some weeks and returned to my company, her joy was so great that she nearly choked herself in her anxiety to get to me, for in those days, to prevent her wandering too far, I had her tied to her foster mother goat by a 20 feet piece of rope. This Gazelle was very attached to her foster mother and never left her up till the time she died, which I believe was due to influenza, as it was during the great epidemic of October 1918. Curiously enough the foster mother died a few weeks later.

GAZELLA—Sp.—The first comment I wish to make on the B.N.H.S. Journal's notes is that all the masks came from Samarra so that the 6 labelled Mesopotamia should really read Samarra, and their dates 15th and 20th January 1918. They were probably indifferently labelled by me and the date of receipts in Bombay noted against them. It is most unfortunate that I should have sent no skins when so many passed through my hands. Of course I imagined that they were the Persian Gazelle, and consequently thought no more about the matter. When out shooting I usually kept the heads and as the remainder of the party preferred the skins, all were satisfied.

These Gazelles were found in vast and numerous herds ; on the undulating plain 15 to 20 miles N. E. of Samarra I have often seen from 400 to 600 Gazelle around us during January and February. Herds varied in size, from a dozen to nearly two hundred animals. Several nice bucks would be found in quite small herds, but large herds were chiefly composed of females. I never came across any horned female ; and as recorded in your notes I, too, was much struck by the extraordinary whiteness of the mask in the older animals. I frequently went out with the L. A. M. B. Cars on patrol and, during halts when the supply tenders were left behind, we used to hunt the Gazelle with light Ford cars and sometimes even with motor cycles. The weapons used were shot guns, with the cartridges cut round the centre wad, so that the charge left the barrel like a bullet, and it was a case of a "kill" or clean miss and no wounding. The method adopted was to slowly follow a herd until right on their heels, which could always be done by gradually closing up to the herd without really frightening them. The car was then let out and the herd would bound off at top speed—after a spell of this the bucks invariably left the herd and after them we went, all out, until the shootable bucks were gradually worn down and overtaken and then shot at a few yards range. I most strongly disapproved of the callous and brutal method of chasing a herd in a car, and pumping lead indiscriminately into it with a magazine rifle, where far more animals were wounded and got clean away, than were ever brought to bag. As might be expected they were most excellent to eat. Some does that had been shot in the middle of January and which I examined contained embryos in the foetus stage. Some of the larger heads I measured were 13½″, 13″, 12½″, 12″, 11½″, 11½″, 11″, 11″, 10½″

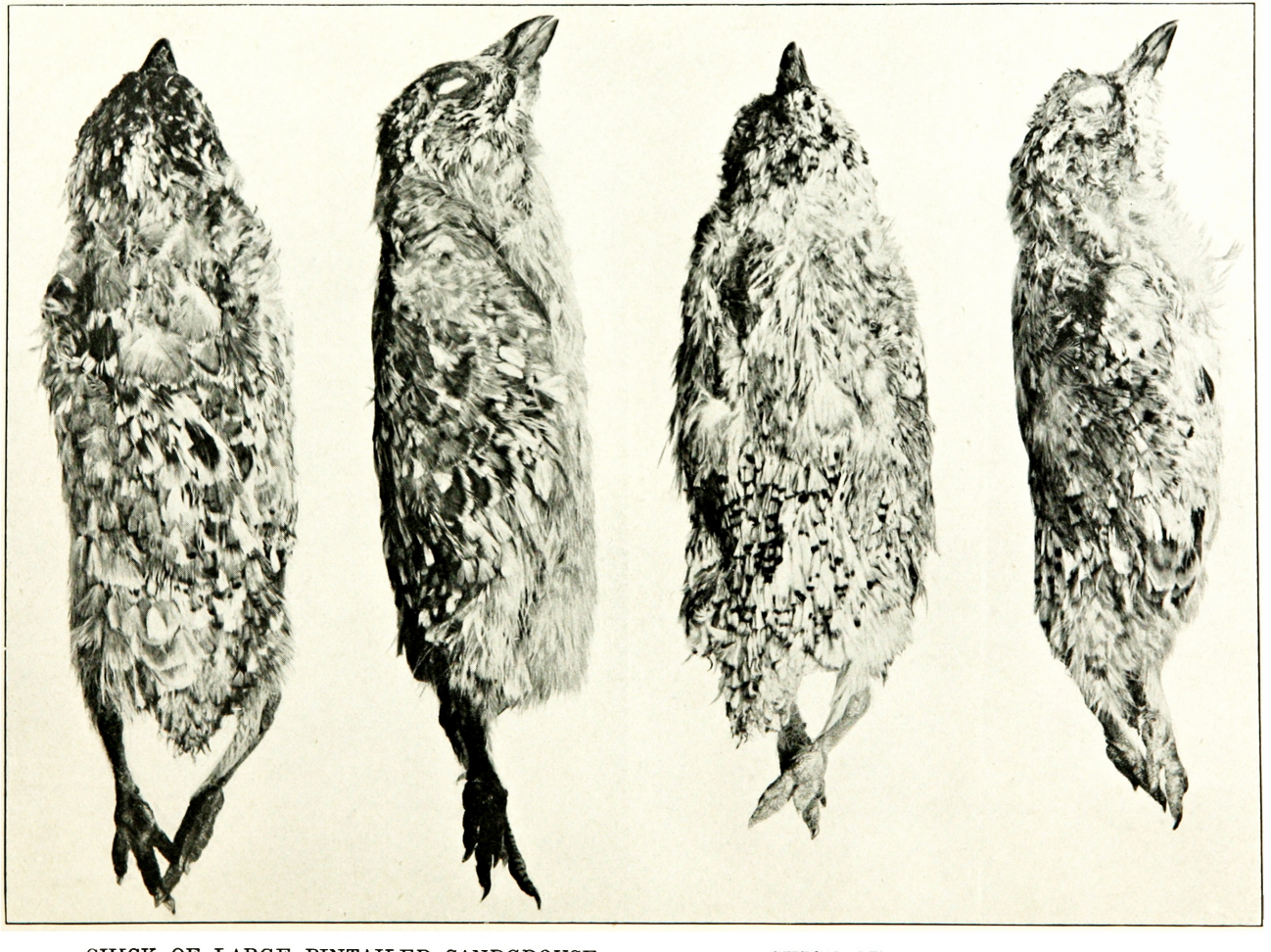
and many smaller. Two cleaned carcase with the heads off, that I weighed, were 23 lbs. and 18 lbs.

Gazelles, whether of this or another species, were reported very plentiful in the desert between Samarra and Tekrit on the right bank of the Tigris, but I never saw any specimens, heads or skins.

Sus—Sp.—*Wild Boar.*—I first came across the Wild Pig of Mesopotamia in the thick, thorny and almost impenetrable scrub in some of the loops of the R. Tigris on the right bank just downstream of Kut-el-amarah, at the end of 1916 and early in 1917 ; but as they only came out of the cover by night I failed to secure any specimens, though our patrols frequently saw the animals after dark. During the pursuit to Bagdad of the defeated Turkish Forces in March 1917, Pig were found plentiful on the left bank of the Tigris wherever the cover was suitable and though I frequently saw them during my beats for Black Partridge I never actually got a shot at any of them. There appeared to be none on the Euphrates near Feluja and the Hindiyeh Barrage, but probably the cover was unsuitable. In July and August, 1917, I found them plentiful on a small scrub cover island in the middle of the Tigris, a few miles downstream of Baghdad. At that time of the year, the river was so low that on the east the island was joined to the left bank by a broad, muddy depression in which a few shallow pools were situate. At night the Pig used to come and drink from these pools as well as from the river itself on the west. On several occasions on moonlight nights I sat up in " hides " near the river and pools to try and shoot one of these animals, but met with little success.

In September and October 1917 we used to ride them in the country near the Shatt-el-adhaim and have great sport, while also a good many were shot. They seemed to run bigger than the Indian Boar, and were very plentiful. At this time of the year there were many sounders of half grown pigs. These animals were quite easy to shoot at night, as there were only a very few pools where they came to drink, but by day they were hard to turn out of the cover, which was so thick and thorny as to be quite impenetrable in many places. I once put up a very large grey Boar by day, but could not get hold of a rifle in time to have a shot at him. In the early mornings shortly after dawn one used to see small parties returning over the plain to thick scrub and cover in the bed of the Adhaim. I should have secured a few skulls, but the third element amongst my men, usually smashed them up and eat them. It ought not to be very hard to secure specimens and skulls for examination.

In early 1918 we found Pig plentiful in the thick scrub on the left bank of the Tigris near Daur (North of Samarra).



CHICK OF LARGE PINTAILED SANDGROUSE
(*Pterocles alchata caudacuta*)

CHICK OF SPOTTED SANDGROUSE
(*Pterocles senegallus*)

N.B.—Both about the same age ; note smaller, weaker bill, smaller feet and paler colour scheme of *senegallus*.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, JUNE 30, 192 .]

"THE BIRDS OF MESOPOTAMIA."

BY

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ASSISTED BY

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PART III.

(*With 2 plates.*)

Continued from page 427 of this Volume.

190. White Pelican. Pelecanus onocrotalus.

1. *Pelecanus onocrotalus onocrotalus*, L. (Syst. Nat., 1758, p. 132—Africa)
2. *Pelecanus onocrotalus roseus*, Gm. (Syst. Nat. 1, p. 570, 1788—Manila)

191. Dalmatian Pelican. Pelecanus crispus.

Pelecanus crispus, Bruch (Isis., 1832 p. 1109—Dalmatia).

The information to hand about Pelicans is not at all satisfactory and fails to clear up the status of these birds. White Pelicans appear to be common. Magrath noted thousands on the Suweikieh marsh in August and says they had quite small young with them. Elsewhere on the inundations huge flocks are to be seen from time to time as the state of the water is favourable or otherwise, as at Kut, Nukta, Amara, near Baghdad, etc., and nearly all records relate to the months of November to April while Pitman noted a migratory movement at the end of February, flocks then travelling north, and he says that Pelicans were absent from the Baghdad floods from April 23rd to the end of July.

Of the Dalmatian Pelican we have but few records ; it was noted by Pitman at Fao and Amara in winter and seen occasionally at Tekrit by Logan Home also in winter ; Zarudny gives it as a winter visitor.

Pelicans breed near Fao whence Cumming sent to the British Museum a number of specimens, chicks and eggs. These specimens Mr. Kinnear has kindly hunted up for me and examined ; of *roseus* there are three immature specimens and an adult, the latter is dated October 24th, 1886, the others bear no date ; of *onocrotalus*, there are two adults and two immature birds, one in December, the rest bear no date. There are two feathering chicks ; in the *onocrotalus-roseus* group the feathering on the forehead ends in a point, in the *crispus-philippinensis* group the feathering ends in a concave margin and judging by this Mr. Kinnear says these chicks are those of *crispus*. In the Ibis, 1891, p. 116, Sharpe referred an adult head, eggs and apparently these chicks (dated October 24th, 1886) to *mitratus* (= *onocrotalus*).

Whether both species breed in Mesopotamia is a matter which requires future investigation as does the status of all three birds, and breeding specimens are desirable.

192. Cormorant. Phalacrocorax carbo.

Phalacrocorax carbo subcormoranus (Brehm). (Ornis, I, p. 42, 1824—Holland).

The Cormorant is a not uncommon winter visitor to the rivers and deeper floods or lakes, from Tekrit and Ramadi to Fao ; it is recorded from October to May, on the 18th of which month Buxton saw a few on the Hamar Lake, but found no evidence of its breeding there nor are there any records suggestive of its doing so in any part of our area.

It moves about locally in winter, doubtless as food supply directs. Cheesman noted that a passing flock flying high were much terrified on meeting an aeroplane and scattered in all directions, quite a different behaviour to Storks under a similar circumstance.

Four specimens obtained : ♀, Sheik Saad, 13-3-17 (Ingoldby) ; ♀, Amara, 4-2-18, w. 334. B. 59 mm. ; ♀, 4-2-18, wing 319, B. 61 mm. ♀, Hamar Lake, 20-5-18, w. 340. B. 66 mm. (P. A. B.).

These birds certainly belong to the smaller European-Asiatic race and not to our familiar form of the British Islands.

193. Pygmy Cormorant. Phalacrocorax pygmæus. "El Echi."

Phalacrocorax pygmæus (Pall). (Reise Prov. Russ. Reichs, ii, p. 712. 1773—Caspian Sea).

Common and resident, breeding in some of the marshes and moving out locally to the rivers and other marshes in winter. Tomlinson received a number of eggs on May 15th, which had been taken by Arabs in the marshes near Ezra's Tomb. An Arab, who knew the marsh birds well, told Logan Home that the Cormorants at Abu Aran in 1919 had nested in April. Pitman saw Cormorants probably of this species in the marshes near Museyib on June 12th, and Cheesman saw many on the Horr Sanaf at the end of March, but no one seems to have actually come across a breeding colony, though probably many must exist in the Euphrates marshes and those to the east of Amara and Ezra's Tomb ; Buxton obtained adults on the Hamar Lake on May 20th.

Specimens examined : ♀, Horr Sanaf, 20-3-18 (P. Z. C. and R. E. C.), ♀, Hamar Lake, 20-5-18; (two) ♀,Ezra's Tomb, 23-12-18; (three) ♂,Horr Hawaize, 13-7-18 (P. A. B.).

These all belong to the European form *pygmæus* and not to the Indian *javanicus*. The younger birds, in the brown dress, of *javanicus* never seem to have the white fllo-plumes on the flanks, rump, mantle and sides of neck which specimens of *pygmæus* in similar state of plumage have.

194. Shag. Phalacrocorax, sp. ?

Several observers noted Shags in winter ; Buxton says he saw them several times in November and December near Amara, Meinertzhagen saw one at Tekrit which he says was a very old *graculus ;* no specimens were obtained and so it is impossible to say what these birds were. Stoneham too saw many on islands below Baiji, and particularly noted some with crests.

The Common Shag (*graculus*) is entirely a west European bird and the Mediterranean Shag (*desmarestii*) is not certainly known east of the Grecian islands, while the Indian Shag (*fuscicollis*) is hardly known west of Sind so it would be of great interest to know what these birds in Mesopotamia really are.

195. African Darter. Anhinga rufus. "Warda."

Anhinga rufus rufus (Lacep.) (Tab. Ois. Daudin, Buffon's Hist. Nat. xiv, p. 319, 1802).

The Darter is common and resident in the huge marshes round Kurna and east of Amara and Ezra's Tomb. Elsewhere we have no records of it. No one seems to have found it nesting but Tomlinson had a number of eggs brought to him on

May 15th from the Ezra Tomb district by the Arabs. Only one specimen was obtained, a male from Ezra's Tomb on February 23rd, by Buxton. I have compared the bird with a large series of African birds; these latter vary very much *inter se* according to age and perhaps individually, and I can match this Mesopotamian bird in every detail with many African skins. A race has been described from the sea of Antioch by Oustalet as *chantrei* (Ann. Sc. Nat., Paris, July 1882, art. 7). All the differentiating characters which Oustalet gives for his race are to be found in many African birds, as already pointed out by Tristram (Ibis., 1886, p. 41); whether *chantrei* is really separable from *rufus* I do not know, but as this Mesopotamian skin cannot be picked out from a series of African ones I must place the Mesopotamian birds as belonging to the typical race, at any rate for the time being.

Mr. Jourdain informs me that of Darter's eggs he received from Tomlinson (sub nomine *chantrei*) "some were white, unmarked and some had the peculiar violet brown blotches already noted in the eggs of this species by Ottosson in eggs from the Lake of Antioch."

196. Grey Lag Goose. Anser anser.

Anser anser (L.) (Syst. Nat. Ed., x, p. 123, 1758—Sweden).

Grey Geese are extraordinarily abundant in the great marshes and swamps of lower Mesopotamia. The main flocks arrive about the last week in October, and from then onwards flock after flock may be seen passing over or arriving daily at their winter quarters, though the first flocks may arrive a week or two earlier. Early in March flocks may be seen again wending their way north and most of the winter visitors have gone by the end of the month. Both of these geese are abundant in winter and many are caught by the Arabs and brought into the markets, such as at Amara, alive for sale.

The Grey Lag Goose besides being a winter visitor is certainly also a resident in small numbers, and very late and very early records probably belong to those birds which remain during the summer in the marshes. Thus Logan Home reports some still left, *mostly paired*, on May 5th, and there are quite a number of records of small numbers seen throughout July in such places as Suweikiyeh marsh, marshes near Ezra's Tomb, and at Gurmat Ali and Akkarkuf in early August. On May 21st when Buxton was at the Hamar Lake he obtained three goslings from the Arabs who had caught them in the reed beds there; two of these were eaten by mud turtles and the third Buxton preserved. Both Buxton and Cheesman say that they have never seen domestic geese in the country, nor any semi-tame Grey Lags in any of the villages; so that it seems perfectly certain that some Grey Lags stop and breed in the marshes. "Gaggles of Grey Lag used to fly in the early morning above no man's land on the way to the Suweikiyeh marsh and were invariably greeted by a ragged fire from the Turkish front line. On one occasion a bird was dropped behind our front line trenches and was safely retrieved, although a machine-gun was laid on to it. The O. C. snipers in my battalion brought down one with his rifle; and aeroplanes used to practise their Lewis guns on these birds. Many of the gaggles which frequented the marshes near Basra roosted during the day well out on the bare desert" (Magrath). Flocks of Geese passing overhead afford tempting shots with a rifle but very few were obtained in this way.

Three specimens examined:—Legait, 12-16 (Livesay); Samarra, 25-12-17 (C. R. P.); *pull* Hamar L. 21-5-18 (P. A. B.).

197. White-fronted Goose. Anser albifrons.

Anser albifrons (Scop.) (Annus 1, Hist. Nat., p. 69, 1769—Carniola).

There is little to add about the White-fronted goose, it appears to come and go at the same time as the Grey Lag. There is no suggestion that it breeds in

the country, nor is it likely to do so, as its known southern limit of breeding range lies much further north. It is very common in winter and large numbers are brought into Amara market alive.

Five specimens examined: Samarra, 22-12-17 (two) (C. R.P.), Mesopotamia and (Bagnel), Amara (two) (P. A. B.).

198. Lesser White-fronted Goose. Anser erythropus.

Anser erythropus (L.) (Syst. Nat. Ed. x, p. 123, 1758—Sweden).

Apparently not at all common; Buxton obtained one out of a small party on some wet irrigated plough land at Amara on November 28th and thought he saw others at different times. Thornhill recorded a flock of five at Wadi on March 20th; Pitman saw a flock at Suweikiyeh marsh on December 3rd. Zarudny records it in winter and he also records *Anser arvensis* as a rare winter visitor; we have no records of any Bean Goose and Buxton failed to meet with it among great numbers of geese in the Amara bazaar.

Pitman seems pretty sure that he saw the Red-breasted Goose on several occasions round Kut, Kurna and Qalet Saleh in winter; Thornhill records that he heard of vague statements regarding geese which seemed suggestive of this species, so awaiting further evidence I do not definitely include it; it is abundant on the south Caspian coast in winter and so might easily occur in Mesopotamia.

199. Mute Swan. Cygnus olor.

Cygnus olor (Gm.) (Syst. Nat. pt. 2, 1789, p. 501—Russia).

Swans are evidently rather rare winter visitors to Mesopotamia. Butler has recorded (S. F., 7, p. 105) that he learnt through the telegraph people at Fao that swans occasionally occur at the head of the Persian Gulf and mouth of the Euphrates.

In the winter of 1916 a herd frequented the Suweikiyeh marshes, as recorded by Thornhill and others; but what species of swan it is that visits the country was unknown until Robinson secured an adult female at Kut on January 8th, 1918, and sent it to the Bombay Museum; it turned out to be of the above species.

200. Common Shelduck. Tadorna tadorna.

Tadorna tadorna (L.) (Syst. Nat. Ed. x, p. 122, 1758—Sweden).

In lower Mesopotamia this species is a fairly common winter visitor to the shallower floods and is, as elsewhere, extremely wary; round Baghdad however and perhaps elsewhere it must breed, as Pitman on July 22nd at L. Akkarkuf saw adults with young ones, and caught and reared four of the latter; there are several other records which shew that some, at all events, are to be met with at a time when they might be supposed to be breeding; thus Logan Home records seeing pairs in May, as also did Pitman at Nukta on May 28th, and Thornhill recorded seeing at pair at Hanna on July 11th; one was seen at Azizieh on June 18th.

Four specimens examined: Amara (P. A. B.), Mesopotamia (Macdonald). Busra (Wernicke) Juv. L. Akkarkuf, 15-8-17 (C. R. P.).

201. Ruddy Shelduck. Tadorna casarca.

Tadorna casarca (L.) (Syst. Nat. Ed. 12, 3, App. Anim., p. 224, 1768—Astrachan).

On the Adhaim river and on the Tigris north of this to Tekrit and probably beyond, and also round Bund-i-kir in the Karun district, the Brahminy duck is resident and breeds; to the rest of Mesopotamia it is a moderately common winter visitor. Pitman says that at Istabulat it breeds in ruins, cliffs, marl

mounds and canal banks ; it was nesting in May and June, the holes going 14 feet in and 7 feet below the level of the ground. Thornhill, who found a nest of eight eggs in low hills near Samarra says the nest was situated 20 feet in and four feet down, they were nesting in April and May. Logan Home put several old birds out of nesting holes in the cliffs of the Samarra-Tekrit area and found a duckling in June. Harrison says of the Adhaim river that the birds were paired off in April and were breeding in May. In the above districts it is fairly common. Tomlinson has recorded it breeding on the Gagar river in April 1908 and found young out in June ; on re-visiting the locality in 1913 no trace could be found of any breeding there and he was told by the natives that none had bred since 1913 ; Cheesman however saw pairs which were evidently breeding in much the same locality, *i.e.*, near Bunder-i-kir on May 24th, 1917. Though it occurs on the Euphrates at Ramadi and Feluja in winter, there is no evidence as yet that it breeds there ; Pitman failed to meet with it at the latter place after May 7th.

One specimen : Amara, 13-1-18 (P. Z. C. and R. E. C.)

I will not swell the list of Mesopotamian birds by including the Egyptian Goose (*A. ægyptiaca*) which Weigold says he saw a pair of " at a great distance " at Urfa on April 11th ; one *may* be mistaken over birds seen at a great distance and further evidence is desirable before admitting this species to our fauna.

202 Mallard. Anas platyrhyncha.

Anas platyrhyncha, L. (=*boschas* auct). (Syst. Nat. Ed. x, p. 125, 1758 —Sweden).

203. Gadwall. Anas strepera.

Anas strepera, L. (Syst. Nat. Ed. x., p. 125, 1758— Sweden).

204. Pintail. Anas acuta.

Anas acuta, L. (Syst. Nat. Ed. x, p. 126, 1578—Sweden).

205. Wigeon. Anas penelope.

Anas penelope, L. (Syst. Nat. Ed. x, p. 126, 1578—Sweden).

206. Shoveler. Spatula clypeata L.

Spatula clypeata, L. (Syst. Nat. Ed. x, p. 124—S. Sweden).

Wild fowl are exceedingly abundant on the rivers, swamps and lakes of Mesopotamia ; the marshes round Kurna, Babylon and the Suweikiyeh marsh, to mention some of the best known, teem in winter with vast flocks of geese and all kinds of ducks, and both reed-girt and open pieces of water are indifferently used. But few arrive before mid-August or early September and the majority come later than this ; most leave in March though in places plenty may yet be seen in April and even into May. On the Adhaim river huge flocks were seen going south during September early in the morning, but this movement ceased by the end of the month.

The Mallard is somewhat unevenly distributed and, as in other places, this is probably due to suitability or otherwise of feeding ground, as it seems to be a more particular duck in this respect than some others ; thus while some found it to be the commonest duck, others reported that it was never very common, for instance in a bag of 100 duck at Nasariyeh only one Mallard figured, while at Ezra's Tomb, Buxton considered it to be the commonest species; of course even in Mesopotamia the Mallard is well able to take care of itself, and this may partly account for its apparent scarcity, as it prefers places where a good look out can be kept, such as the river or the middle of large pieces of water.

If it is doubtful if the Mallard breeds in Mesopotamia, at least there is no certain evidence. The late Captain Thornhill has recorded that he saw it in every month of the year and that it probably breeds ; I questioned him about it (and I know he was too good a *shikari* to have confused it with any other duck)

and he was quite certain about it, though he could give me no positive proof of nesting. Buxton thinks that on Akkarkuf lake on October 12th he saw flappers which " almost certainly belonged to this species ". Some certainly stay very late; a flock of 20 were seen by Logan Home on May 21st, and some appear very early, by July, (Magrath) and a good many by mid-August ; so that it is within the bounds of possibility that some may nest, though further evidence is desirable.

The Gadwall is another very common and widely distributed duck, but there is nothing particularly noteworthy to say about it. A few are recorded as early as August 1st and some stop late—May 6th, a pair at Feluja, May 15th and 21st small lots seen on Euphrates inundation. There is no evidence at all that it nests.

In places Gadwall make up a large proportion of the bag, 40 and 47 being reported in two bags made in January on the Euphrates inundation.

Three specimens examined : ♂, Sheik Saad, 24-1-17 (P. Z. C. and R. E. C.). ♂ Basra 1-19 (Hobkirk). Amara (P. A. B.).

The Pintail is common enough and appears to arrive and depart with the mass, there being no particularly early and late records ; first seen September 13th and last noted April 13th ; just at the time of departure huge flocks congregate together on the inundations.

The Wigeon is exceedingly abundant and is often seen in winter in great flocks on the marshes round Ezra's Tomb and Amara, etc.; they move off early in March, the last seen was on April 9th ; they arrive late with the main mass, but early ones were noted in August near Baghdad.

The Shoveler is exceedingly common and perhaps the best distributed, as almost any kind of water suits it and thus it may be found in places other ducks would scorn, such as canals, small pools and puddles as well as being found in the marshes, lakes and inundations. It is plentiful by the first or second week in September and a few linger on into May, there being records on May 15th, 17th, 19th ; there is however no suggestion that it breeds.

Being universally distributed and less wary than other ducks it figures largely in the bag in some spots ; 20 or 30 are often got and in two bags of 100 birds, Shovelers formed 90 and 95 per cent., respectively.

An albino was reported by Logan Home.

Three specimens examined : ♀, Samarra, 4-1-18(C. R. P.), Amara (P. A. B.); ♀ Sheik Saad, 24-12-17 (Robinson).

207. Marbled Duck. Anas angustirostris.

Anas angustirostris Ménétr. (Cat. Rais. Caucase, p. 58, 1832—Lenkoran).

The Marbled Duck is a fairly common resident ; it breeds in the vicinity of the Tigris and Euphrates in scrub along the banks to Baghdad and Feluja. It seems to prefer dry situations not far from the river or marshes ; Pitman found a nest, in a *Sueda* bush close to crops, at Hindia Barrage some hundreds of yards from a canal, containing 10 eggs, and fresh eggs were brought in on May 28th and June 9th ; in this locality it was plentiful. Thornhill found several nests below Kut and obtained two hard set clutches of five and six eggs on May 15th and 18th. Tomlinson records it breeding at Ali Gharbi, and Logan Home located a colony near Amara. At Shush and Shushtar it also must nest as breeding birds have been obtained by Cheesman and Tomlinson ; and Watts found it breeding at the former place at the end of May.

Three specimens examined : ♂, Shush, 2-5-17 (P. Z. C. and R. E. C.) ; near Basra (Wood) ; ♂, Amara, 21-4-18 (P. A. B.).

208. Falcated Teal. Anas falcata.

Anas falcata, Georgi (Bemerk. Reise Russ., 1, p. 167, 1775—Asiatic Russia).

Thornhill can hardly, I think, have made a mistake when he recorded that a male in full dress was shot on the river at Hanna on March 19th, 1916. Thornhill knew this and other Indian ducks exceedingly well and I personally interrogated him about it, and I do not think there can be any doubt that he was correct in his identification ; it can only be a rare straggler so far west ; it has occurred at least twice in Europe.

209. Common Teal. Querquedula crecca.

Querquedula crecca (L.) (Syst. Nat. Ed. x, p. 125, 1758—Sweden).

The Common Teal is an abundant winter visitor some arriving very early ; large flocks were reported near Baghdad on July 17th, on the Euphrates floods on July 31st and on Suweikiyeh marshes in mid-August. The majority however come in September. It is very widely distributed as it not only frequents marshes and lakes, but also the smallest irrigation canals in bare desert country, flooded fields, etc. Bags of 30 or 40 are often made and a bag of 64 is recorded. Most leave again in mid-March and the last were seen in the second week of April.

Cheesman records that on May 2nd he found Marbled and Common Teal both "evidently breeding " in a rush and willow covered Jheel at Shush ; this is the only evidence at all that this species nests within our limits and the fact requires further confirmation.

Four specimens examined : Amara. (two) (P. A. B.), ♀, Basra, 8-3-17 (Stevens) ; ♂, Samarra, 5-2-18 (C. R. P.).

210. Garganey. Querquedula querquedula.

Querquedula querquedula (L.) (Syst. Nat. Ed. x, p. 126, 1758—Sweden).

The Garganey, though scarce, is fairly well distributed in winter, but is much commoner as a bird of passage in August and September and again in April. Flocks were seen as early as July 17th near Baghdad and as late as May 21st. In the marshes near Hindia Barrage, Pitman clearly identified at close quarters; a flock on June 12th ; Logan Home records seeing them also in June, while Magrath says he caught a duckling on the Suweikiyeh marsh which he presumed to have been of this species, as he saw adults. It is possible therefore that a few remain to nest, though further definite evidence is required.

211. Tufted Duck. Nyroca fuligula.

Nyroca fuligula (L.). (Syst. Nat. Ed. x, p. 128, 1758—Sweden).

212. Common Pochard. Nyroca ferina.

Nyroca ferina (L.). (Syst. Nat. Ed. x, p. 126, 1758—Sweden). "Harra."

213. Red-crested Pochard. Netta rufina.

Netta rufina (Pall). (Reise. Russ. Reichs. App., p. 713, 1773—S. E. Russia).

In the absence of any outstanding early records as we have with the surface feeding ducks, it may be taken that these diving ducks arrive in Mesopotamia later and it is probable that not many are seen before October. These three are widely distributed and common on suitable sheets of water and are often seen resting in flocks on the rivers themselves. Round Amara, Buxton noted that the Tufted was rarer than the Common Pochard, but in other places it appears to be common enough. The bulk of these diving ducks leave in March, but Buxton found that the Common Pochard in the main stayed longer, and both Tufted and this species may be seen up to the second week of April. The Red-crested Pochard is fairly common but hardly as numerous as the other two ; stragglers linger on till the last week in April.

One specimen of each preserved.

214. Scaup. Nyroca marila.

Nyroca marila (L.). (Fauna Suecica, Ed. 2, 1761, p. 39—Lappland).

Zarudny records it as a rare winter visitor to the Karun area. It is not likely that this species, which much prefers salt water in winter, will be found in the Mesopotamian marshes and lakes.

215. White-eyed Pochard. Nyroca nyroca.

Nyroca nyroca (Güld.) (Nov. Comm. Petrop., 14 pt. 1, p. 403, 1770—S. Russia.)

The White-eye must be a common duck in winter but there are hardly any records of it. Logan Home says many were seen and a few shot on the Euphrates inundations, and Zarudny gives it as a winter visitor.

216. Golden Eye. Glaucion clangula.

Glaucion clangula (L.). (Syst. Nat. Ed. x, p. 125, 1758—Sweden).

This is not a common duck ; occasional birds are to be seen frequenting the rivers, singly or quite a small party together ; Ludlow saw a flock and shot one at Hit ; Thornhill obtained a male at Hanna on March 20th and there are odd records from the Tigris, Euphrates and Shat-al-Arab.

217. Smew. Mergus albellus.

Mergus albellus (L.). (Syst. Nat. Ed. x, p. 129, 1758—Smyrna).

This species too is uncommon ; a few are recorded from the Tigris and Shat-al-Arab in winter, and like the Golden-eye it would seem to prefer the rivers to the lakes ; it occurs singly or in quite small parties. The acuity of vision of these and other species which obtain their living in the waters of the rivers must be very great, as the water is so loaded with silt that to the human eye it appears quite opaque.

Two specimens were obtained near Amara by Cheesman and Bagnall in February and December, and two by Buxton at Amara.

[The Goosander has been recorded as having been seen fairly commonly on the Tigris by Meinertzhagen (Ibis, 1914). No other records of this species are to hand and no specimens have been obtained. The Merganser (*M. serrator*) has been obtained at Bushire but not so far in Mesopotamia.]

218. Stiff-tail Duck. Erismatura leucocephala.

Erismatura leucocephala (Scop.) (Annus. 1, Hist. Nat., p. 65, 1769—N. Italy).

A rare duck in Mesopotamia ; one was obtained by Hobkirk at Gurmat Ali on April 21st ; another near Kut by Thornhill on February 6th and a third on a jheel (Abu Jisra), 70 miles north of Baghdad, on March 23rd, 1920, by Major Chrystall ; possibly one or two others were obtained.

219. Flamingo. Phoenicopterus ruber.

Phœnicopterus ruber antiquorum, Temm. (Man. d'Orn. 2, p. 587, 1820—Europe).

The Flamingo is a not uncommon resident and in some favoured localities it may be said to be abundant, such as in the marshes round Museyib. But almost anywhere where suitable inundations exist some may be seen in any month of the year, the flocks moving about locally according to the varying conditions of the marshes. Doubtless many move away to their nesting haunts in the breeding season, but a good many non-breeding and immature birds remain behind.

According to Cumming it breeds on the Koweit side of the head of the Gulf, whence I believe he obtained from the Arabs many eggs which are now in the Karachi Museum.

The Flamingo is generally distributed throughout our area.

220. Common Heron. Ardea cinerea.

Ardea cinerea cinerea, L. (Syst. Nat. Ed. x, p. 143, 1758—Europe).

The majority of this species are no doubt winter visitors, but a number may be met with during the summer months in suitable places such as the marshes at Museyib, etc. As this heron does not breed in its first year doubtless many of these are non-breeding birds ; though no nests were reported yet it is quite possible some may breed in these extensive swamps, indeed Cumming had eggs brought to him at Fao said to have been taken on the Abdulla Banks ; they may have come from there or perhaps the marshes on the Koweit side ; Logan Home thought it might nest on the cliffs at Tekrit as he saw birds in the vicinity from April to June but no definite evidence was forthcoming. It is common in winter and widely distributed. Probably a certain number are passage migrants as Cheesman saw a flock pass over Shaiba, an oasis well out in the Arabian desert, on September 16th flying S. W. which direction would take them towards the centre of the Arabian continent.

One skin examined : L. Akkarkuf, 12-8-17 (C. R. P.).

221. Purple Heron. Ardea purpurea. "Er Kheawwi."

Ardea purpurea purpurea, L. (Syst. Nat. Ed. xii, p. 236, 1766—East Europe ?)

The Purple Heron is reported in all months of the year as common and it probably is quite resident. We have however no definite information of its nesting and yet one can hardly doubt its doing so with such extensive marshes at hand so eminently suited to its requirements. It is reported as common in the breeding season in the marshes of the Amara-Kurna district and at Museyib. Pitman remarks that this species is not so common as *cinerea,* but where it is found, it swarms ; there are naturally many places where the latter may be found which do not suit the Purple Heron, which likes lakes and swamps with plenty of cover in the way of reeds and rushes.

One bird was found which, in trying to swallow a three-quarter pound fish had become *hors de combat* through partial suffocation ; however much smaller 'fry' does not come amiss as Buxton found a dragon fly of the genus *Anax* in the gullet of one he shot.

Cumming obtained eggs at Fao which were said, like all his eggs of the *Ardeidæ,* to have been taken near the Abdulla Banks, presumably from the marshes on the Koweit side.

Ten skins examined : ♂ ? , Kurna, June 1916 (F Wall) ; Qalet Saleh, 7-7-17 (Elmhurst) ; L. Akkarkuf, 26-7-17, 26-8-17, 21-8-17 (C. R. P.) ; five, Amara (P. A. B.)

222. Goliath Heron. Ardea goliath cretzschm.

Ardea goliath cretzschm (Ruppel's Atlas Reise n. Afr. Vög., p. 39, 1826).

In the extensive swamps of Mesopotamia this gigantic Heron is not uncommon and evidently resident. It is reported from the marshes that lie between Basra and Kurna, from those near Amara and Kut and round the Euphrates Barrage, while there are odd records from Feluja and Samarra. Sir Percy Cox obtained young ones from the marshes at Kurna and sent them alive to the Bombay Natural History Society. Buxton remarks that in the field this species much more resembles the Purple than the Common Heron.

This is one of those species which Africa may be said to have contributed to the Mesopotamian fauna, it is found throughout tropical Africa outside of which it is only known in Ceylon and parts of eastern India, where it is rare and sporadic, a very curious distribution.

223. Reef Heron. Demiegretta asha.

Demiegretta asha (Sykes). (P. Z. S., 1832, p. 157, W. Coast of India).

The Reef Heron only occurs in our area on the Fao littoral. Armstrong found it fairly common at Fao and had eggs brought to him, said to have been taken on the Khor Abdulla, on May 20th, 1917. Cumming records it as also common there and obtained several birds and received eggs from the Koweit side. In the *Ibis*, 1886, Sharpe records two of these birds obtained by Cumming as *gularis*, the west African bird ; Mr. Kinnear has examined these birds afresh for me in the British Museum and he considers them to be nothing but *asha*. Both blue and white phases of plumage occur and Cumming considered the white to be the juvenile dress, an observation I cannot confirm.

It is a quite resident species and being essentially a salt water bird is not likely to occur inland.

224. Buff-backed Heron. Ardeola ibis.

Ardeola ibis ibis (L.) (Syst. Nat., 1758, p. 144—Egypt).

This Heron does not seem to be very common and its status is rather uncertain ; Cumming thought that it was resident at Fao and says it is supposed to breed near the Abdulla Banks, in the marshes on the Koweit side. All our records relate to the months of March to October so may be it is a summer visitor. Logan Home noted it at Abu Aran in June. Cheesman records that a flock alighted in a cottonfield at Sheik Saad on September 16th and thinks they were on passage ; two, which he obtained there, were the only specimens preserved.

225. Squacco Heron. Ardeola ralloides. "Mush-'bea Beda."

Ardeola rallöides (Scop). (Annus i, Hist. Nat., p. 88, 1769—Carniola).

The status of this bird requires further investigation ; all our records relate to the months March-September except two, *viz.*, January 6th (Shat-al-Arab) and October 23rd (Ramadi), so that, on the face of it, it would appear to be a summer visitor. From the end of March it is common in suitable places in small flocks of eight to twenty individuals, and some were thought at this period to be migrating, as at Feluja, Basra, etc. On May 19th, Buxton found it at the Hamar lake and shot a specimen with the sexual organs enlarged, but he was told by the Arabs that it does not breed there; on June 5th near Amara he saw plenty ; Pitman too, in the marshes around Museyib met with it commonly in June and July and supposed it was breeding, while near Baghdad it was common in July-August and September ; in many places in August and September it is noted as common. Cumming says it is resident at Fao and is supposed to breed in the marshes on the Koweit side of Fao. It seems therefore likely that the species will be found breeding in the marshes of Mesopotamia, though up to now there is no certain record.

Eight specimens examined : ♂, Hamar Lake, 20-5-18 ; Baghdad, 31-3-18 ; Amara, 14-4-18 (P. A. B.) ; ♂, Nahr Umar, 26-3-18 ; Feluja, 27-3-17 ; near Baghdad, 8-8-17 (C. R. P.) ; ♂, Basra, 19-4-17 (P. Z. C. and R. E. C.) ; Basra (Hobkirk).

I do not think this Heron can become adult at the first spring ; some of these are in adult plumage, others at the same time of year are in immature dress.

Ardeola grayi has been recorded from Bushire ; we have no evidence of it occurring within our area.

226. Little Egret. Egretta garzetta.

Egretta garzetta garzetta (L.) (Syst. Nat. Ed. xii, p. 237, 1766. "In Oriente ").

As with several of the Heron tribe, the status of this bird cannot be made out with certainty. Cumming thought it was resident and recorded that it was supposed to breed near the Abdulla Banks. All our records are of small numbers seen in the months of April, August and September which suggests that it is a

passage migrant or possibly a summer visitor whose breeding quarters were not discovered by any observer, quite a possibility when the huge expanse of some of the marshes is remembered.

Pitman records small flocks on passage at Feluja on April 26th and 27th ; the earliest date on which this species was noticed was April 14th and there are several records from the lower Tigris during this month. It was noted again on August 5th and, on and off, till early in September near Baghdad and in other places. Pitman obtained one specimen on August 23rd ; there are two others in the British Museum.

227. Great White Heron. Egretta alba.

Not very common ; there are scattered records from widely separate districts from November to February so that probably it is a winter visitor in small numbers. Logan Home records a pair at Samarra on May 12th. Zarudny gives it as a passage migrant in the Karun area. No specimens were obtained but it probably is the typical race which occurs.

228. Night Heron. Nycticorax nycticorax.

Nycticorax nycticorax nycticorax (L). (Syst. Nat., x, p. 142, 1758—S. Europe).

The status of the Night Heron is not at all clear ; Cumming says it arrives at Fao in October and leaves in May and from other evidence it is quite clear that it is present in winter ; on the other hand there is good proof that in places it nests, so that perhaps at the most it is a local migrant. As elsewhere it seems to have its favourite haunts, so that where it occurs, hundreds may be seen together, whereas over large tracts of country it may not be met with at all. Thus near Qalet Saleh there is a very big roost where thousands come to spend the day in the date palms, and Buxton noted a fair sized roost at Amara in March, otherwise one may say it is generally distributed, though patchily.

Tomlinson records that it breeds at Shustar in June and Logan Home found a colony six miles below Amara where the birds on April 11th were just beginning to build, while at Samarra he saw five or six fully grown young by the river bank on June 12th ; it probably breeds near Museyib, according to Pitman.

Four skins examined : Lake Akkaruf, 18-8-17 (C. R. P.) ; Amara, 12-1-18 (P. Z. C. and R. E. C.) ; Amara, two (P. A. B.).

229. Little Bittern. Ixobrychus minutus. "Moodoo-wacha."

Ixobrychus minutus minutus (L.). (Syst. Nat. Ed. xii, p. 240, 1766—Switzerland).

Though Zarudny gives this species as a passage migrant and winter visitor, it appears from our records that the majority are summer visitors and some perhaps resident all the year. We have very few winter records and it is not until the end of March and early April that it becomes at all numerous. It breeds fairly commonly in lower Mesopotamia at all events, but appears to be commonest in the Basra district to Fao and Shush. Nest building commences in the first week of May or a little earlier and fresh eggs may be found from mid-May to early June. Tomlinson has found eggs as early as May 8th. According to Hobkirk and Logan Home the nests are situated in dense high reeds in the marshes and made of dead reeds and placed about two feet above the water ; an unusual site for a nest was found by the latter observer ; the nest was fifteen feet up in a mulberry tree growing by the water side, it was built of fine twigs and lined with green mulberry leaves, the male was standing on the empty nest on May 4th ; when visited again on the 17th the nest contained seven eggs, a number which was reported on two other occasions, though five or six is more usual ; the female, when incubating, sits very close.

Four specimens examined : ♂, Kamisiyeh, 4-1-17 (Aldworth) ; ♀, Shush 3-5-17 (P. Z. C. and R. E. C.) ; ♂ ♀, Basra, 22-5-19 (L. Home).

230. Common Bittern. Botaurus stellaris.

Botaurus stellaris stellaris (L.). (Syst. Nat. Ed. x, p. 144, 1758—Sweden).

A winter visitor in small numbers to those lakes and marshes which afford suitably thick cover. In the marshes south of Baghdad it is not very uncommon and found singly as a rule, and usually one or two are flushed when out duck and snipe shooting. The earliest record is September and the latest April 20th and a straggler in May.

Two specimens examined : ♀, Basra, 8-3-17 (Stevens) ; Amara (P. A. B.).

231. White Stork. Ciconia ciconia. "Haji Lug-a-Lug."

Ciconia ciconia ciconia (L.) (Syst. Nat. Ed. x, p. 142, 1758—Sweden).

Common ; partly resident, also a passage migrant ; many no doubt are summer visitors and some spend the winter. To what extent the breeding birds are resident or summer visitors cannot be determined,as Storks may be seen in every month of the year and large numbers pass over Mesopotamia at the times of migration; to the lower parts of the plains it is a winter visitor and passage migrant.

The breeding rangé of the Stork in Mesopotamia is somewhat curious; a line drawn from about Babylon on the Euphrates to Baghdad and then across to Mendali in the foot-hills makes the southern limit of the range except that a few nest at Shustar and Shush in Khuzistan (but not Ahwaz) ; to the north of this line every town on both rivers has its colony, and nests on houses,mosques and tall poplars are familiar to all who have been there, even Jonah's tomb at Nineveh is occupied. They start to repair their nests early in the year ; on February 19th at Samarra, and on the 21st at Beled, operations had begun. Nesting is in full swing by April and feathered young were noted in June. After the breeding season they collect in the neighbourhood in vast flocks preparatory to migrating or scattering further afield in the country, and so, from the end of July onwards, Storks may be seen in those parts where they do not breed. From mid-September till the end of October they are common and well distributed throughout the country and during this period large flocks may be seen passing, circling round and round at a great height, drifting south before the wind, doubtless migrants from further north. In winter it is scarce, but some may be met with in favoured spots all the winter in many different places. Spring migration starts early and begins fairly regularly in the middle of February and lasts through March and up to the first week in April during which time they become common again and frequent flocks may be seen going over north or north-west.

The migrations of the Storks are well known to the Arabs who suppose that they go on an annual pilgrimage to Mecca and are accordingly venerated by them for this, and because they select mosques for building their nests on, hence their title of " Haji." So much are they respected that when the question arose as to whether the golden tiles on the mosque at Samarra should be repaired the idea was abandoned as it entailed disturbing the Stork's nest, until someone suggested that as " Haji Lug-a-lug " was away at Mecca the nest was, for the time being, not required and so the repairs might be undertaken !!

Unlike some other species of birds, the flocks of these birds were not at all disturbed by aeroplanes flying close to them. The curious breeding distribution seems inexplicable, it cannot be on account of climate, or lack of suitable towns, as these exist at Sera, Baghela, Kut, etc., and Sera is no great distance from Kerbela where it nests and both are about equidistant from Baghdad. It has been suggested that they have remained from time immemorial on the sites of ancient cities which formed their breeding quarters when lower Mesopotamia was under the sea, but were this so Nasariyeh, Ahwaz, etc., should have their nesting colonies. It has been reported as breeding at Fao (Cumming) and at Old Basra (Stoneham) on hear-say evidence ; our latest information is that it does not breed at Fao now.

232. Black Stork. Ciconia nigra.

Ciconia nigra (L.). (Syst. Nat. Ed. x, p. 142.—N. Europe).

Apparently a rather rare winter visitor; Cumming obtained one at Fao on September 5th, Magrath saw it near Amara on May 20th and there are a few records in winter.

233. Spoonbill. Platalea leucorodia.

Platalea leucorodia major, Tem. and Schl. (Faun. Jap. Av. p. 119, 1849—Japan).

The Spoonbill is either resident, or perhaps a summer visitor to Mesopotamia as we have no records between November 1st and the end of March. It is common in the marshes of the Euphrates and Tigris moving about locally as its food supply directs. A good many flocks are recorded in these marshes during the breeding season and it may possibly breed there; it certainly breeds somewhere as Cumming had a number of eggs brought him at Fao *said* to have come from Khor Moosa and the Abdulla Banks whence Armstrong also obtained eggs on May 20th.

No specimens were obtained, but those Cumming got at Fao were examined by Mr. Ogilvie Grant and were referred to this larger eastern race.

234. Glossy Ibis. Plegadis falcinellus. "Slinder."

Plegadis falcinellus falcinellus (L.) (Syst. Nat. Ed. xii, p. 24, 1766—Austria).

The status of this species is obscure and records are not very numerous; perhaps it is resident. Near Amara Buxton noted it in February, April, May and August and says it probably breeds. It is recorded in fair numbers at Kurna in January. It is noted as common near Baghdad from July to September and Magrath found it common in the Suweikiyeh marsh in August where it was "evidently breeding."

Buxton obtained one skin.

235. Red-cheeked Ibis. Comatibis emerita.

Comatibis emerita (L.) (Syst. Nat. Ed. x, p. 118, 1758—Switzerland).

It would seem that this Ibis is but a straggler to our part of Mesopotamia; Logan Home saw a few near Tekrit in February and thought it might breed in the Fatah Gorge cliffs or in the higher rocky hills of the Jebel Hamrin, but there is no evidence that it does so. Cheesman who went all over the Fatah Gorge in the breeding season and was at Tekrit in every month of the year failed to find it; however one was shot at Tekrit by Aldworth. There is of course a very well known colony at Beredjik consisting, so Weigold estimated in 1912, of a thousand, whence they wander out to other places, such as Bambudj, fifty miles south.

One was brought home alive to the Zoo from Beredjik by Capt. E. H. Buxton. The bird is considered sacred by the Arabs.

336. White Ibis. Threskiornis æthiopicus.

Threskiornis æthiopicus (Lath.) (Ind. Orn. ii., p. 706, 1790—Africa).

White Ibises certainly occur and not very uncommonly in the district from Amara to Fao; but there are no records from Baghdad and northwards. All records relate to the winter months and to small flocks seen, except that Logan Home records them paired off in Amara marshes but gives no date. Cumming says they are plentiful and Fao in winter and obtained one there on October 25th (recorded as *melanocephala*, Ibis. 1891, p. 113). Hartert (Vog. Pal. Faun., p. 1226) states that the Sacred Ibis (*Th. aethiopicus*) occurs at Fao and Zarudny mentions it (J. F. O., 1911, p. 231) as a very rare vagrant to the South Caspian region. Mr. Kinnear therefore has been kind enough to hunt up Cumming's bird

in the British Museum and he tells me that it has been incorrectly identified as the Indian bird, *melanocephala*, and is undoubtedly an example of the African bird—the Sacred Ibis—*Th. æthiopica*.

237. Common Crane. Megalornis grus.

Megalornis grus (L.) (Syst. Nat. Ed. x, p. 141, 1758—Sweden).

The Common Crane is a not uncommon winter visitor and probably a fair number pass through on passage for quarters further south. It seems to be generally distributed in the marshes. No specimens were obtained.

238. Demoiselle Crane. Anthropoides virgo.

Anthropoides virgo (L.) (Syst. Nat. Ed. x, p. 141, 1758—N. Africa).

There are few records of this Crane ; probably the status is much like that of the Common Crane but fewer in numbers.

239. Great Bustard. Otis tarda.

The Great Bustard is almost confined to the rolling plains in the north of our area ; Meinertzhagen records that it was not uncommon round Mosul in January 1914, where he saw droves of seven and fifteen birds. Thornhill saw seven near Wadi early in March 1916.

There are somewhat vague and uncertain records of the bird from Kut and Feluja, but Watts saw a flocks of six, a day's march from Amara ; Weigold saw two near Urfa in April and Egerton obtained one at Kizil Robat.

Exact status unknown. No specimens examined.

240. Little Bustard. Otis tetrax.

The status of this bird is quite unknown, Tristram met with it at Urfa in 1881 and it occurs over the Syrian boundary in that region. It was vaguely reported in several places in lower Mesopotamia, but the only record which seems certain is of a bird seen near Shush by Watts, and reported to me by Ludlow, who described the characteristic " butterfly" flight. Cumming relates that he once shot a smaller Bustard than the Houbara at Bushire and obtained another like it on board ship at Fao ; probably they were of this species although they were never satisfactorily identified.

Zarudny says this Bustard occurs in the Karun district where also the Florican (*Sypheotis auritus*) is an accidental wanderer.

241. Houbara. Chlamydotis undulata.

Chlamydotis undulata macqueeni (Gray). (Ill. Ind. Zool., ii, 1834—India).

The Houbara is pretty common in suitable places throughout Mesopotamia and is resident, or at the most a local migrant. It is, of course, a bird of grassy plains and desert country in which there is a certain amount of scrub. In the Samarra-Tekrit district it is common, occurring in parties of three to ten, sometimes singly, and it is reported as fairly common from Hit downwards on the Euphrates and as far as Kut on the Tigris; below this it is rather less numerous, no doubt due to suitable ground being less extensive. In the foothills it is common again at Mendali, Shush, Bund-i-Kir and doubtless elsewhere and it inhabits suitable parts of the Arabian desert on the west side of the river. According to Mr. Philby it is common in the Hinterland of Arabia and breeds freely there.

Logan Home and Aldworth found two nests on May 5th in the Samarra district and another on May 19th on the grassy plains near the river ; the nests contained one, two and three eggs respectively, those taken on the 19th being very far incubated. Pitman reports it breeding in May and June on the plain between Baghdad and Museyib, and it evidently nests round Kut, Rumailah and doubtless in many other localities. There are eggs in the British Museum from Koweit

(Cumming), Zobeir (Marshall) and Diz, April 25th (Douglas). In the Bombay Museum there is an egg taken in March by Capt. Wilson in lat. 33° (south of Baghdad).

One skin examined : ♂, 25-10-18, Samarra (P. Z. C. and R. E. C.).

242. Stone Curlew. Burhinus œdicnemus.

1. *Burhinus œdicnemus saharæ.* (Rchw.) (J. f. O., 1894, p. 102—Tunis).
2. *Burhinus œdicnemus astutus,* Hart. (Nov. Zool., 1916, p. 93—Fao).

The Stone Curlew is fairly common in suitable places and both the above races occur. Unfortunately the collections do not contain any breeding birds and so the status of the two races cannot be made out, but Stone Curlew are to be found throughout the year and breed in the country. Logan Home noted it as common on the shingle islands along the river at Samarra on June 15th, the birds were paired and were courting; it is also found all up the river to Tekrit, he also saw it at Shaiba in May and June. Pitman noted quite large flocks of twenty to a hundred individuals in the Adhaim area from September to November, they spent the day in the scrub and flighted out to the plains at night, at which time they were very noisy; specimens which he obtained at that time I refer to *saharæ.* On August 1st Buxton found Stone Curlews common in the stony desert at Khanikin whence they flighted to the valleys at sundown, one he obtained there is certainly *astutus* and the date is early enough to suggest that it was a breeding bird of the district; on the other hand Pitman obtained a specimen of *saharae* at Lake Akkarkuf on August 21st. It would be very remarkable if both these forms breed in the same area, possibly one is a hill form and comes to the plains early in autumn and the other is resident in the plains. Further investigation is required on this point and some breeding birds from different areas are essential.

Pitman obtained incubated eggs in the flat open country near R. Hai near Kut on June 15th and two stale incubated eggs on May 20th near the Es Sinn position. Stoneham says that this bird is quite good eating.

(1) L. Akkarkuf, 21-8-17; Adhaim, 27-9-17, 9-10-17 (two) (C. R. P.); ♀, Shustar, 2-1-18 (F. M. B.); Frontier of Arabistan, 1916 (W).; wing, 232-250, bill (base) 41·5-43 mm.

(2) ♀, Khanikin, 1-8-18; wing 243 (P. A. B.); ♂, Sheik Saad, 3-10-16; wing 246, bill (base) 43·5 mm. (P. Z. C. and R. E. C.); also a specimen from Fao in the British Museum.

243. Cream-coloured Courser. Cursorius gallicus.

Cursorius gallicus gallicus (Gm.) (Syst. Nat. i, pt. 2, p. 692, 1789—France).

Without being called a rare bird the Courser, except perhaps in a few places, cannot be said to be common, and is rather local; though no nests were found it undoubtedly breeds and is resident.

Though found in the bare flat mud desert it would seem to prefer the sandier and more pebbly parts, such as the edge of the Arabian desert on the west of the Euphrates and in the Adhaim area, and the former district at any rate no doubt forms its chief breeding grounds, where Logan Home saw plenty in the breeding season and a family party of old and young were met with on May 25th at Shaiba at Chunabdah in the same area and near Hindia barrage it was also reported in the breeding season, while Magrath notes it at Kut in July. A good deal of local migration probably takes place in the autumn. Buxton says that some he met with in clay desert, when the sun was low and casting a heavy shadow, were most conspicuous.

The young of the year moult their body-plumage and tails in the autumn, as with other Limicoline birds.

Five specimens examined: Amara, 17-12-17 ; ♂, juv. Basra, 19-8-17 (P. A. B.) ; Amara, 2-12-17, juv. Shaiba, 12-8-18. (P. Z. C. and R. E. C.) ; Basra, 8-9-19 (L. Home).

These appear to me to be quite typical, wings 160-166 mm.

244. Common Pratincole. Glareola pratincola.

Glareola pratincola pratincola (L.). (Syst. Nat. Ed. xii, p. 345, 1766—Austria).

The Pratincole is a summer visitor and locally abundant. It arrives in the last days of March and by the end of the first week in April it is numerous in the areas in which it intends to breed.

There are many colonies dotted about in our area of which a few may be mentioned ; it breeds at Feluja ; on the drying edges of Lake Akkarkuf ; near Museyib ; at Chaldari, near Baghdad ; Samarra ; Suweikiyeh marsh ; Abu Aran ; near Fao ; and Ahwaz. The drying edges of marshes and inundations are favourite sites for colonies, the eggs being deposited in some depression such as a hoof mark in the dry hard mud ; at Samarra they were nesting on shingle on the edge of the river and at Ahwaz on sandy islands in the Karun below the rapids. At Chaldari and Sera, Cheesman found colonies on hard bare sun-baked desert some miles from the river.

Fresh eggs may be obtained at the end of April. Few birds are more demonstrative when they have young about than this species ; Cheesman says that on invading a colony, there were birds on the ground in all directions with drooping flapping wings, feigning disablement ; while Pitman, who witnessed the same performance, notes that in some lights the effect was very curious and that the display to draw off attention gave the appearance of a snake coiling about or a big lizard moving along ! !

Buxton noted that birds flying over a recently dried marsh at Amara were nearly out of gunshot but two birds then obtained had their mouths full of small "water-boatmen" (*Corixidæ* and *Notonectidæ*) which must have been flying at that altitude in bright sunshine. Others, which Cheesman examined, contained *Coleoptera* and Locust remains. Stoneham says they may be seen feeding on *Termites* after rain.

The Pratincole probably departs in August, the latest record is September 3rd.

Nine skins examined : ♂, Amara, 15-5-18 ; ♂, ♀, 7-4-18 (P. A. B.) ; ♂ ♀, Ahwaz, 30-4-17 ; ♂ ♀, Sera, 2-5-19 ; ♀, Baghdad, 12-5-19 (P. Z. C. and R. E. C.) ; Feluja, 15-4-17, (two) (C. R. P.).

These appear to me to be quite typical.

245. Black-winged Pratincole. Glareola nordmanni.

Glareola nordmanni, Fischer. (Bull. Soc. Imp. Nat. Moscow, xv, 1842, p. 314—S. Russia).

There is little to record about this species. Pitman shot two at Feluja on April 15th and saw them there and between there and Baghdad in May, where they were evidently breeding, as also at Hindia barrage. At the end of July and beginning of August he met with some on L. Akkarkuf. They were nowhere plentiful and were apparently breeding in the same colonies as the common species. The two birds obtained had their crops crammed with half grown locusts.

246. Red-necked Phalarope. Phalaropus lobatus.

Phalaropus lobatus (L.). (Syst. Nat. Ed., x, p. 148, 1758—Hudson Bay) (=*hyperboreus*, auct.).

Zarudny gives this Phalarope as a passage migrant and winter visitor. It may occur, though I never saw it, in the sea off Fao in winter, and might be found on passage in the marshes of our area.

247. Woodcock. Scolopax rusticola.

Scolopax rusticola (L.). (Syst. Nat. Ed., x, p. 146, 1758—Sweden).

The country being unsuited to this bird's requirements, it is only a rare or perhaps occasional winter visitor. In different years there are six records of it at Basra from November to February; Aldworth obtained one at Tekrit in high crops on November 11th, 1918; and Thornhill records one at Kut on October 6th, 1916. In January and February 1918 they were said to have been "rather plentiful" in suitable places on the Diala river in the foothills district. It was met with also at Ahwaz.

248. Common Snipe. Gallinago gallinago. "Jehalül" or "Naja el Maya."

Gallinago gallinago gallinago (L.). (Syst. Nat. Ed. x, p. 147, 1758—Sweden).

Common winter visitor, abundant in suitable marshes. The first may be seen as early as August 3rd, quite a few by the middle of the month, but the bulk do not arrive till later. Plenty are still present in mid-April, most have gone by early May and stragglers are noted at the end of that month. There is no evidence that any remain to breed, Pitman found it absent from the marshes in the Museyib district in June and July. The Arabic name "Nāja-el-Māya" means "water-goat", evidently in reference to the drumming sound which, though constantly heard in the breeding season, may also sometimes be heard in the winter.

In favourable localities a couple of guns may easily obtain 40 to 50 couple in a day.

Three skins examined: ♀, Amara, 7-4-18 (P. A. B.); Samarra, 6-3-18 (C. R. P). ♀, Sheik Saad, 26-1-18 (Robinson).

Zarudny gives *raddei* also as a winter visitor; I am unable to recognize this race.

249. Great Snipe. Gallinago media.

Gallinago media (Lath.). (Gen. Synop. Supp., i, 1787, p. 292—England).

Our records tend to show that this species is a passage migrant, though Zarudny records it in winter also. Thornhill records it at Haibi in April where a small patch of wheat and flooded grass seemed full of them. Cumming met with it at Fao in April and Buxton got one at Amara on April 14th; it is also recorded from Shush in spring; Logan Home met with single birds near Basra on August 3rd and 29th, and Connor obtained one there on September 16th.

250. Jack Snipe. Limnocryptes gallinula.

Limnocryptes gallinula (L). (Syst. Nat. Ed., xii, p. 244, 1766—France).

Generally distributed in winter in suitable localities throughout our area and common; time of arrival was not noted, it was still common at the end of the first week in April.

251. Broad-billed Sandpiper. Limicola falcinellus.

Limicola falcinellus (Pont.) (Danske Atlas, 1, 1763, p. 623—Denmark).

Cumming obtained several at Fao in August and September where it must be common. We have no further records.

252. Terek Sandpiper. Terekia cinerea.

Terekia cinerea (Guld.) (Nov. Comm. Petrop., xix, 1775, p. 473—Terek River, S. E. Russia).

Probably common at Fao on the tidal mud flats where Cumming obtained several at the end of August and early in September. Essentially a maritime wader in winter.

253. Little Stint. Erolia minuta.

Erolia minuta minuta (Leisl.) (Nach. zu Bechst. Naturg. Deutsch., 1812 p. 74—Hanau, Germany).

Buxton found this species abundant on spring and autumn passage in the marshes Magrath and Meinertzhagen noted small parties along the rivers in winter.

Exact status not fully known, probably a winter visitor and a passage migrant, as Zarudny states.

Four specimens examined : ♂ ♀, Akkarkuf, 6-10-17 ; ♂, Amara, 7-4-18 ; ♂, Baghdad, 21-9-17 (P. A. B.).

254. Temminck's Stint. Erolia temmincki.

Erolia temmincki (Leisl.) (*t. c. supra*, p. 78).

Winter visitor, fairly common in the inundations and along the rivers in suitable places. Some are probably passage migrants also.

Five specimens examined : Samarra, 8-2-18. ; Akkarkuf, 16-8-17 (C. R. P.); ♀, Amara, 24-3-18 ; ♂, 5-10-17 ; one, 30-12-17 (P. A. B.)

255. Dunlin. Erolia alpina.

Erolia alpina alpina (L.) (Syst. Nat. 1758, p. 149—Lappland).

Common winter visitor, arrives early in August and remains till the middle of May. Apparently some remain all the summer as non-breeding birds, as Logan Home saw " many " at Ratawi on June 19th.

Dunlins frequent edges of inundations, flooded fields, river banks, associating with Stints.

Three specimens examined : Amara, 25-1-18 ; Sheik Saad, 18-12-16 (P. Z. C. and R. E. C.) ; Samarra, 24-12-17 (C. R. P.) ; four, Amara, Jan.-April (P. A. B.).

These belong to the typical race, with bills 32-27 mm., wings 116-119 mm., which in my opinion extends east to western Siberia. I have already pointed out (Bull. B. O. C., xxxiii, p. 99) that there is not sufficient difference between birds from Lappland and West Siberia to warrant the distinguishing of a separate race from the latter locality, so far as present material is available. Hartert (Vog. Pal. Faun., p. 1576) recognises this race from Siberia doubtfully and lists it as ? *Erolia alpina pusilla.* Falk. 1786. If *Tringa* is used for the Stints, as is done in the B. O. U. list, then *pusilla* cannot be used for this race even if it were recognisable as it is not the *Tringa pusilla* of Linnæus, 1776.

256. Curlew Sandpiper. Erolia ferruginea.

Erolia ferruginea (Brün.) (Orn. Bor., 1764, p. 53—Iceland) (=*subarquata* auct.)

Meinertzhagen and Zarudny both record the Curlew Sandpiper in winter ; Buxton obtained examples at Amara in December and April ; probably it is a winter visitor and passage migrant.

[The Knot is recorded from the backwaters of the Tigris near Baiji, but as no skins were obtained and there are no other records for Mesopotamia I omit it. It would be interesting to confirm that this species winters on fresh water and so far inland, as I certainly do not think it is usual.]

257. Sanderling. Calidris arenaria.

Calidris arenaria (L.) (Syst. Nat. Ed., xii, p. 251, 1766—England).

Zarudny lists the Sanderling as a winter visitor, presumably to the head of the Gulf littoral. Probably common there.

258. Ruff. Machetes pugnax.

Machetes pugnax (L.) (Syst. Nat. Ed., x, p. 148, 1758—Sweden).

Status doubtful and there are few records. Pitman found a few on L. Akkarkuf early in September, Livesay saw many on the Euphrates marshes on May 15th. Zarudny says it is a winter visitor to the Karun district, and Neumann records it from Ras-el-ain on February 14th. Stoneham notes it at Ctesiphon on March 22nd and Ludlow at Ahwaz on the 29th. Probably a not uncommon winter visitor and passage migrant.

One skin examined : L. Akkarkuf, 2-9-17 (C. R. P.).

259. Redshank. Totanus totanus.

Totanus totanus totanus (L.) (Syst. Nat. Ed., x, p. 145, 1758—Sweden).

Common winter visitor and generally distributed. It arrives at the end of July, but most come back in the middle of August and it is recorded up to the end of May, though most have gone a week or two earlier. Magrath records that he heard it near Amara on June 29th, so perhaps some non-breeders spend the summer.

Four skins examined : Samarra, 22-1-18 ; 25-12-17 (C. R. P.) ; ♀, Basra, 3-1-19 (Armstrong) ; ♀ Amara, 30-12-17 (P. A. B.).

Not distinguishable from W. European examples.

260. Spotted Redshank. Totanus maculatus.

Totanus maculatus (Tunst.) (Orn. Brit., 1771—England).

Zarudny records this as a winter visitor to the Karun district and Stoneham noted it at Samarra on May 17th. It is recorded from Biredjik by Weigold on May 1st and Ludlow shot two near Ahwaz in March. Probably it is commoner than the above records indicate.

261. Marsh Sandpiper. Totanus stagnatilis.

Totanus stagnatilis Bechst (Orn. Taschenb., ii., 1803, p. 292—Germany).

Probably a not uncommon winter visitor ; recorded by Zarudny, and Buxton obtained one at Baghdad on March 13th.

262. Greenshank. Totanus nebularius.

Totanus nebularius (Gunn.) (Leem. Beskr. Finm Lapp. 1767, p. 251—Norway).

Fairly common winter visitor; some arrive at the end of July; most of them in August ; leaves at the end of April.

Two skins examined : ♀, Azizieh, 16-10-08 (P. Z. C. and R. E. C.) ; ♀, Baghdad, 26-9-17 (P. A. B.).

263. Common Sandpiper. Tringa hypoleucos.

Tringa hypoleucos (L.) (Syst. Nat., 1758, p. 149—Sweden).

A winter visitor generally distributed on the rivers and canals but commoner as a passage migrant. It apparently arrives as early as mid-July and it is recorded as leaving about the middle of May. Tomlinson says it is resident at Basra and " immature birds were seen in the summer " but this does not necessarily prove that it breeds in Mesopotamia. Pitman too thought he saw it in the Hindia barrage marshes in June and July. Quite possibly some may spend the summer in their usual winter quarters if they are not going to breed that year.

Four skins examined : ♀, Amara 14-9-18 ; ♀, 14-4-18 (P. A. B.) ; ♂, Ahwaz, 24-5-17 (P. Z. C. and R. E. C.) ; Feluja, 9-4-17 (C. R. P.)

264. Green Sandpiper. Tringa ochropus.

Tringa ochropus, L. (Syst. Nat. Ed. x, p. 149, 1758—Sweden).

265. Wood Sandpiper. Tringa glareola.

Tringa glareola, L. (Syst. Nat., Ed. x, p. 149, 1758—Sweden).

Both Wood and Green Sandpipers are fairly common. They arrive during August and both are recorded up to the middle of May by which time most have gone. Whereas the Green Sandpiper is certainly present all the winter, there are only two records of the Wood Sandpiper after October, odd birds being recorded by Pitman in February and December, so that in the main the latter species is a passage migrant and probably the former to some extent also.

266. Black-tailed Godwit. Limosa limosa.

Limosa limosa (L.) (Syst. Nat. Ed. x, p. 147, 1758—Sweden).

A common winter visitor frequenting the muddy margins of floods, etc. It arrives early in August and probably departs again in April and May. A certain number however spend the summer in the Euphrates marshes, as round Museyib and Ratawi; these of course are non-breeding birds as is the case with many other waders.

Six specimens examined: L. Akkarkuf, 12-8-17; 17-8-17 (C. R. P.); ♀, Baghailah, 11-3-17 (Ingoldby); ♂ ♀, L. Akkarkuf, 10-17; ♂, Amara, 17-2-18 (P. A. B.).

267. Bar-tailed Godwit. Limosa lapponica.

Limosa lapponica (L.) (Syst. Nat. Ed. x, p. 147, 1758—Lappland).

Recorded by Pitman from the mud banks of the Shat-al-Arab in January. It is probably common there.

268. Common Curlew. Numenius arquata.

Numenius arquata (L.) (Syst. Nat. Ed. x, p. 145, 1758—Sweden).

Common as a winter visitor and also as a passage migrant. Cumming says it arrives at Fao in July and leaves in March. Pitman records it as first seen in the Hindia marshes on July 10th, and huge flocks were passing over to the south-east during the first week in August near Baghdad. On the return passage he noted large flocks frequently from mid-April to May 25th at Feluja going north-east in the evenings.

It is equally at home on the floods and marshes as on the foreshore at Fao.

One skin: ♀, Amara, 8-1-18 (P. Z. C. and R. E. C.).

269. Whimbrel. Numenius phæopus.

Numenius phæopus (L.) (Syst. Nat. Ed. x, p. 146, 1758—Sweden).

Common passage migrant, arrives in July and August and the passage lasts till the end of September. Passes through again in April and May. Some may overwinter as Cumming records it as a winter visitor to Fao, and odd ones may pass the summer since Magrath records it from near Amara on June 30th.

270. Slender-billed Curlew. Numenius tenuirostris.

Numenius tenuirostris, Vieill. (N. Dict. d'Hist. Nat. viii, 1817, p. 302—Egypt).

Status quite unknown. Buxton saw many on December 16th, 1917, in a temporary winter lake in a hollow in the bare desert ten miles north of Amara and secured a specimen. This is the only definite record.

271. Black-winged Stilt. Himantopus himantopus.

Himantopus himantopus (L.) (Syst. Nat. Ed. x, p. 151, 1758—Egypt).

Resident and common in the larger marshes, spreading out in winter to temporary floods, etc. Magrath records that it breeds in the marshes above Amara but was much disturbed by shell fire in 1916.

Numbers breed on the Suweikiyeh marsh, some breed near Basra, and Pitman found it breeding plentifully in the Hindia and Museyib marshes. The first nest he found was on May 31st containing three incubated eggs; the nest was

just a hollow in spongy ground; he found many more nests between June 2nd and 12th and all these nests were on mud mounds well above the general level and well out on the marsh; the birds had apparently constructed these mounds themselves; three or four eggs were the usual full clutch and the eggs varied very much in colour and markings. See plate.

Five specimens examined: L. Akkarkuf, 18-7-17 (C. R. P.); Amara, 24-1-18 (P. Z. C. and R. E. C.); ♂, Amara, 16-6-18; ♀, 24-3-18; ♂, Shahroban, 30-7-18 (P. A. B.).

272. Avocet. Recurvirostris avocetta.

Recurvirostris avocetta (L.) (Syst. Nat. Ed. x, p. 151, 1758—Sweden).

The Avocet is not very common but is resident and breeds. Quite small parties or single birds may be met with in the non-breeding season almost anywhere on the rivers and marshes. The only district that there are any records of its breeding in is Museyib where, on the west side of the Euphrates, Pitman found it nesting and on June 3rd took a nest of four eggs; the nest was just a depression in the ground on the edge of a marsh with a little grass material as lining; he also saw a few on L. Akkarkuf in July which he thought had bred there.

There are eggs in the British Museum labelled "Mesopotamia."

Four skins examined: ♂, Amara, 1-1-18 (two) (P. A. B.); ♂, Amara, 8-1-18 (P.Z.C. and R. E. C.).

273. Golden Plover. Pluvialis apricarius (=pluvialis, auct.).

Pluvialis apricarius (=*pluvialis*, auct.) (L.) (Syst. Nat. Ed. x, p. 150, 1758—Sweden).

274. Asiatic Golden Plover. Pluvialis dominicus.

Pluvialis dominicus fulvus (Gm.) (Syst. Nat. i, pt. 2, 1789, p. 687—Tahiti).

The Golden Plover is recorded as a winter visitor and the Asiatic bird as a passage migrant by Zarudny in the Karun district.

We have no records of the former, but Capt. Hanna obtained three of the latter near Sheik Saad on January 21st, 1921, as he informs me.

275. Grey Plover. Squatarola squatarola.

Squatarola squatarola (L.) (Syst. Nat. Ed. x, p. 149, 1758—Sweden).

Cumming obtained this species at Fao in September and October where it is probably a common winter visitor.

276. Common Ringed Plover. Charadrius hiaticula.

Charadrius hiaticula tundræ (Lowe). (Bull B. O. C., 36, p. 7, 1915—Yenisei).

Some records of the Little Ringed Plover may refer to this species as most observers were not aware that both occur, or simply entered their records as "Ringed Plover." The status of this bird is therefore doubtful, but it must be either a winter visitor or a passage migrant; Zarudny lists it as both. Buxton obtained two young examples on L. Akkarkuf on September 26th and October 6th where it is not uncommon. These have black bills and dull ochre-coloured legs and feet; a male measures in wing 123 mm. and an unsexed bird 127mm. From their small size and the darkness of the mantle I refer them to the Siberian race described by Lowe, though I am not quite certain that his name can stand. Mr. Schiöler (*Dansk Orn. F. Tids.*, 1915, p. 177-9), has gone very fully into the question of this race and its name, and considers that Mènètriès name *intermedius* should be used, but as this name is not quite clearly referable to this bird, it is perhaps better to drop it, as should be done with most doubtful names.

277. Little Ringed Plover. Charadrius dubius. "Dah rooj."

Charadrius dubius curonicus, Gm. (Syst. Nat. T. p. 692—"Curonia").

Common and resident through the length and breadth of our area moving about locally after the breeding season; there is no evidence of any influx in autumn of winter visitors. Pitman found it nesting in the Euphrates marshes near Museyib on June 3rd. Logan Home met with it breeding on the river above Samarra and found several nests containing four eggs between May 21st and June 2nd. Cheesman found them just beginning to breed on the pebbly banks at Baiji in April. It probably breeds at Feluja, L. Akkarkuf, Nahr Umar and many other places. In winter it is frequently seen along the foreshore of the rivers and sides of canals as well as on the inundations and is perhaps the commonest and most widely distributed small wader.

Eight specimens examined: Baghdad, 8-10-17, 5-10-17; Khanikin, 1-8-18 (P.A.B.); Feluja, 21-3-17, 7-4-17 Samarra, 8-3-18; Baghdad, 18-8-17 (C. R. P.); Fatah Gorge, 18-4-19 (P. Z. C. and R. E. C.).

The wings of these birds measure 109·5-120 mm. and bills from edge of forehead feathers 12·5-13·5 mm

278. Large Sand Plover. Charadrius leschenaultii, Less. (=geoffroyi auct.).

Charadrius leschenaultii, Less. (=*geoffroyi* auct.) (Dict. Sci. Nat. XLII, p. 36, 1826—Pondicherry, India).

Common at Fao where Butcher and Cumming obtained several specimens in August, February and March and where I saw a flock on March 16th.

279. Kentish Plover. Charadrius alexandrinus.

Charadrius alexandrinus alexandrinus L. (Syst. Nat., 1758, p. 150—Egypt).

The Kentish Plover is pretty common and resident throughout our area. It particularly affects the drying edges of temporary marshes and such situations are favourite nesting sites. The breeding season lasts from the end of April till the end of June; Ludlow records finding several nests at Ahwaz on April 29th. At Abu Aran, above Kurna, Logan Home found several nests in June on small sandy islets in a reed grown marsh, where also Little Terns, Pratincoles and White-tailed Lapwings were nesting. Buxton and Evans found nests at Amara on May 26th and June 5th on sandy ridges on a dried up piece of marsh; the nests were lined with a few bents and quite a number of shells which the birds had been at pains to gather, as Buxton noted that they were not common. It breeds round Basra, at the Suweikiyeh marsh and doubtless many other places.

Two specimens examined: ♀, Amara, 22-1-18, wing 109, bill 15 (P. A. B.); ♀, Sheik Saad, 18-12-16, wing 109·5, bill 15·25 mm. (P. Z. C. and R. E. C.). These both belong to the typical race.

280. Caspian Plover. Charadrius asiatica.

Charadrius asiatica asiataca, Pall. (Reise Russ. Reichs ii, 1773, p. 715—S. Tartary).

Common, but rather local, on spring and autumn passages. Pitman saw flocks of thousands on the fertile plain on the left bank of the Tigris from Kut to Azizich in the first week of March, and on the 19th he saw a flock on cultivation at Feluja. Cheesman found it plentiful, feeding round gardens on desert land at Sheik Saad on March 26th. Cumming obtained a young one at Fao on August 11th, while Pitman saw a large flock on a semi-cultivated plain near Samarra on November 18th.

Five specimens examined: ♂, Sheik Saad, 21-3-17, 25-3-17; ♀ 25-3-17 (P. Z. C. and R. E. C.); Kut, 2-3-17 (two) (C. R. P.).

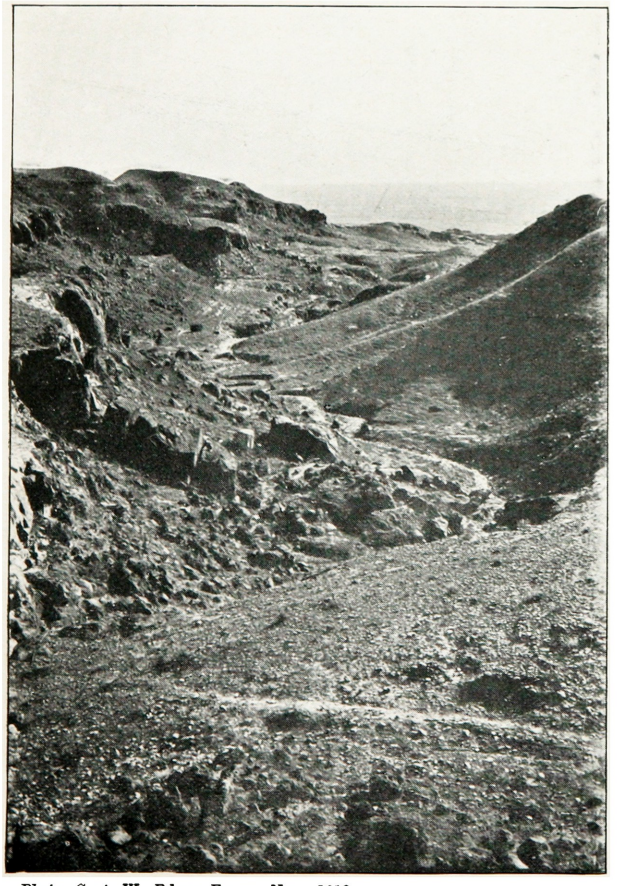

Photo. Capt. W. Edgar Evans, Nov., 1918.

A.—Valley in the Jebel Hamrin, N.E. of Baghdad. Haunt of See-see, &c.

Photo. Capt. W. Edgar Evans, 17th May, 1918.

B.—Nest and 4 eggs of *Chettusia leucura*, near Amara,

All are in breeding dress except one ; they are finishing or have finished a body moult which seems to be complete below, but only partial on the upper parts where many feathers are worn and, as no new ones are coming through, these perhaps will be retained for the summer. The odd bird is in winter dress still.

281. Dotterel. Eudromias morinellus.

Eudromias morinellus (L.). (Syst. Nat. 71758, p. 150—Sweden).

A common but local winter visitor. Pitman noted it as common on the undulating wastes covered with grass near Samarra during the winter, where it occurred in vast flocks. It is reported as plentiful at Feluja and common in the Karun district. Elsewhere it occurs according to our records sparsely and in quite small numbers. Last record April 7th.

Seven skins examined : Arab village, 3-12-16 (P. Z. C. and R. E. C.); Feluja, 11-4-17 Samarra, 20-1-18 (C. R. P.) ; Amara, 16-12-17 (P. A. B.) ; Feluja, 1-11-17 (Ludlow) ; ♂ Khamisiyeh, 24-11-16 (Aldworth) ; Ramadie, 16-11-18 (Brooking).

282. Sociable Lapwing. Chettusia gregaria.

Chettusia gregaria (Pall). (Reise. Russ Reichs I, 1771, p. 456—S. E. Russia).

This species is a winter visitor and like the two previous Plovers it is very local, but where it occurs at all, good numbers may be met with. Logan Home recorded it in large flocks on the Tekrit uplands from October to February and Pitman met with it plentifully in huge flocks on the cultivated plain between Kut and Azizieh at the end of February. Cheesman found flocks on the desert near Tel-al-lahm 20 miles from the river. It is recorded from Basra, Ezra's Tomb, Urfa district and Ras-el-Ain. The latest record was on April 4th. Like the two previous species this bird prefers cultivated land and grassy uplands to marshes.

Three specimens examined : ♀, Ezra's Tomb, 3-12-18 ; ♂, Tel-al-lahm, 28-12-18 (two) (P. Z. C. and R. E. C.)

283. White-tailed Lapwing. Chettusia leucura. "Tatwa."

Chettusia leucura (Licht.). (Eversm's Reise v. Oremb. nach Buchara p. 137, 1823, between Kuwan and Jan-Darja).

Very common resident, breeding round the inundations, temporary and permanent marshes ; in winter spreading further afield and some may even migrate. Unlike the last three Plovers this is a true denizen of the marshes and is never found far from water. The breeding season begins about the second week in May and full clutches are universal early in June. In the Euphrates marshes round Museyib and Hindia Barrage, Pitman came across great numbers of this species nesting in the first week of June. The nests were on the edge of the marsh or on semi-submerged islets, indeed many nests had been flooded out. So numerous were they there that he several times examined 50 to 100 nests in an hour, and a tiny islet might hold three or four nests. He describes the nest as being much like that of the Peewit ; the eggs four in number, vary a good deal in size and markings and are smaller and more clay-coloured than those of the Red-wattled Lapwing. Logan Home, who found a colony at Abu Aran on June 8th, says the nests were on the edges of islands in a marsh and usually 5 to 10 yards from the waters edge. These islands were sandy with small hillocks and patches of short grass here and there on them and were closed in by high reeds all round. The nests were of the usual Plover shape with a few bits of shell under the eggs.

He says that, unlike the Pratincoles and Little Terns which were nesting there, these birds were very wary and would not go on to their nests while he was on the island. Like the Peewit they are very noisy at the nesting ground.

Other breeding grounds are the Suweikiyeh marsh, L. Akkarkuf, marshes round Amara, and doubtless many other places.

In the Samarra-Tekrit area where less amount of suitable ground is to be found it is somewhat local and Pitman thought many moved away from that district in winter.

Six specimens examined: Frontier of Arabistan (Wilson) ♀, Hindia Barrage, 22-3-19 (P. Z. C. and R. E. C.); ♀, Amara, 30-12-17, (two) ♀ Amara, 26-2-18. (P. A. B.); ♂, Basra, 19-3-18 (C. B. T.)

284. Red-wattled Lapwing. Sarcogrammus indicus.

Sarcogrammus indicus aigneri, Laubm. (Falco 9, p. 10, 1913—Las Belas in Beluchistan).

It is of considerable interest to find this Lapwing, which is so common and familiar to everyone in India, has spread westwards along the Mekran and Persian Gulf into Mesopotamia. It is not uncommon, widely distributed and of course resident. Unlike the Indian Roller, which has but a limited distribution in our area, this Lapwing, which can adapt itself to almost any circumstances compatible with a Plover's life, has extended throughout the length and breadth of Mesopotamia; from the Karun and Basra districts it may be traced up the Euphrates to Feluja and up the Tigris to Tekrit, Samarra and Mosul while it is found out on the Persian frontier at Shahroban and Khanikin. The breeding season begins in the middle of April and eggs are reported as late as June 6th. The nest unlike that of the White-tailed Plover is placed " high and dry," generally some little distance from water and is a mere scrape after the fashion of its kind, nor is it colonial in its nesting habits like the last named, each pair jealously guarding its own territory. In winter it is subject to local migrations.

Three specimens examined: ♀ Amara, 1-12-17, wing 229, bill 38 (P.A.B.); Sheik Saad, 2-11-16 w. 225·5, B. 36, (P. Z. C. and R. E. C.) ♂, Sheik Saad 14-12-17, w. 233, B. 38 (Robinson).

These are not to be distinguished in any way from Baluchi specimens, whence came the type of *aigneri*.

285. Spur-winged Lapwing. Hoplopterus spinosus.

Hoplopterus spinosus (L.) (Syst. Nat., 1758, p. 151—Egypt).

Zarudny records this as a rare winter visitor to the Karun district. Pitman seems certain he saw some near Kurna in January. Weigold says he saw it apparently breeding at Bambudj and Beredjik just over the Mesopotamian boundary in Syria. The status of this bird in Mesopotamia requires further investigation.

286. Common Lapwing. Vanellus vanellus.

Vanellus vanellus (L). (Syst. Nat. 1758, p. 148—Sweden).

A winter visitor in small numbers and widely distributed throughout our area. It apparently arrives late in the autumn, the first record being on October 22nd and the majority do not arrive till early November. Buxton, who found it common at Amara, noted that it disappeared at the end of February and the latest date we have any record of is March 4th. In some marshes it appears to be pretty common, but most records refer to small flocks or small numbers.

Four specimens examined:—Samarra, 13-12-17 (C. R. P.); ♂ Tekrit, 9-12-18 (P. Z. C. and R. E. C.); Amara, 27-11-17, 10-12-17 (P. A. B.)

287. Oyster-catcher. Hæmatopus ostralegus.

Hæmatopus ostralegus, L. (Syst. Nat., 1758, p. 152—Sweden).

The Oyster-catcher is not a very common winter visitor; small parties may be met with on the inundations and mud-banks of the Tigris and Euphrates in their lower reaches and it was once recorded as far north as Baghdad; at Fao.

it is probably not uncommon. There are several records of it during the breeding season, but there is no indication that it nests in our area. As it is recorded in nearly every month of the year it is impossible to say what its migratory movements are.

One skin examined: Amara, 16-3-19 (Logan Home).

288. Crab Plover. Dromas ardeola.

Dromas ardeola, Paykull (K. Sevensk. Vet. Ak. Handl. 26, pp. 182-188, 1805—India).

This, essentially a maritime species, is only known in our district in the Fao littoral. Here Cumming obtained specimens in October and eggs from the district. Probably these came from the Khor Abdulla, as Armstrong, while at Fao, ascertained that it breeds there in large numbers and had eggs brought to him on May 20th from there. From the Arab who obtained them Armstrong ascertained the following facts.

The Khor Abdulla, or Abdulla banks, are situated on the Arabian side of Fao, distant about 15 miles, in an old estuary of the Shat-al-Arab; they are a group of rocks with much mud and sand silted up in between them, and round them is a huge mud flat at low water; on the Khor the Crab Plovers nest in colonies, excavating burrows two to four feet long into the sand, at the end of which *one or two* eggs are deposited. The breeding season is well known to the Arabs who do quite a trade both in birds and eggs in the country around. The birds are taken from the burrows, put into baskets and taken to Basra for sale; Armstrong who tried eight of them in a pie found they were very good eating; they had been taken from nest burrows and all were females.

This account agrees very well with that of Huskisson and Nash who visited breeding colonies on islands near Bushire (*Hume's Nests and Eggs*·4, p. 328) except that they invariably found a single egg in each burrow and I think we may take it that this is the correct number.

This aberant species lays a pure white egg, utterly unlike a wader's egg, and is very large for the size of the bird.

Comparatively little is known about the nesting economy of this bird and should any ornithologist be able to visit the Khor in the nesting season and make observations there he would be well repaid for the discomfort of the heat. Eggs may be looked for early in May and both eggs and young early in June. Spirit specimens of both chicks and adults are great *desiderata* for working out the relationship of this anomalous bird.

289. Turnstone. Arenaria interpres.

Arenaria interpres (L). (Syst. Nat. 1758, p. 148—Sweden).

Probably not uncommon at Fao as a winter visitor. Finch obtained one on February 17th and Cumming shot one there on June 18th so that probably some non-breeding birds spend the summer there.

(To be continued.)

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, JUNE 30, 1922.]

RECORDS AND DESCRIPTIONS OF ORTHOPTERA FROM S. W. ASIA.

BY

B. P. UVAROV, F.E.S.

(*With 2 text figures.*)

Our knowledge of the Orthopteran fauna of the vast deserts of S. W. Asia (Persia, Mesopotamia, Arabia, Baluchistan, Afghanistan, N. W. India) is, so far, extremely fragmentary, this particular group of insects not being usually favoured by collectors. At the same time, each lot of Orthoptera brought home from there, however small and accidently collected it may be, gives the strongest proof of the great richness and originality of that fauna. Endeavouring to collect as full records of species, inhabiting the Asiatic deserts, and of their geographical distribution, as it is possible, I have recently worked out all the odd specimens from Arabia, Baluchistan, Afghanistan, Persia and Syria in the British and Paris Museum collections; a small collection sent by the Bombay Natural History Society, containing the specimens taken by Lt.-Col. J. E. B. Hotson in Baluchistan, Capt. G. C. Shortridge, Lt.-Col. F. P. Connor and Lt.-Col. H. D. Peile in Mesopotamia, and by Mr. Peter Paschen in Persia (tbe latter lot received by the Society through Colonel P. Gough) has also been identified by me and several new forms described in the present paper. The total number of specimens studied in preparing this paper scarcely exceeds two hundred and the proportion of new species and even genera is simply astonishing. I hope that this fact will encourage all entomologists, who have the opportunity of collecting in those countries to pay more attention to a class of insects usually ignored and regarded as "uninteresting" *viz.*:—Grasshoppers, Katydids, Crickets and other members of the order Orthoptera; the writer will be very pleased to examine and work out all collections of Orthoptera from the Desert regions in Asia, however small and casually made they may be.* The types of new forms, described in this paper, are in the British Museum.

Mantidæ.

1. EREMIAPHILA LÆVIFRONS, sp. n.

♀: Head as broad, as pronotum; facial clypeus distinctly convex, without any trace of upper carina, smooth, sparsely impresso-punctate; ocellar area scarcely concave; transverse furrow delimitating this area from vertex feebly developed; vertex smooth, with lateral furrows distinct, but shallow, while the intermediate furrows are scarcely developed. Pronotum as broad anteriorly as it is long; distinctly narrowed posteriorly; fore margin convex in the middle, bisinuate laterally; lateral margins distinctly convex; hind margin convex; fore and hind angles a little more than 90°, acute; upper surface smooth with a transverse oval gibbosity at the fore margin and two smaller gibbosities posteriorly. Elytra distinctly coriaceous, with raised veins, longer than broad widely rounded anteriorly and at the apex, with hind margin almost straight, slightly excavate beyond the middle. Wings broader than long, with hind angle acute, rounded apically. Fore femora and tibiæ armed with four spines outwardly.

General colouration clay yellow. Head and underside whitish. Elytra beneath with a subapical oblique transverse blue-black band, not reaching the fore margin, and with a not sharply defined dark border; both the band and the

* Collections may be sent directly to the author (British Museum [Natural History] Cromwell Road, London, S.W.7.) or through the Bombay Natural History Society. If any particulars as to the best methods of collecting and preservation are wanted the author will be glad to answer enquiries.

dark border are well visible on the upside of elytra, as well. Wings unicolorous brownish, with lighter border. Legs whitish beneath and clay-grey, with scarcely perceptible transverse bands on the upper side.

	♀ (type).	♂ (paratype).
Length of body	32,5 mm.	23,5 mm.
Length of pronotum	6, 5	5
Width of „ anteriorly	6, 5	5, 5
„ „ posteriorly	5	4
Length of elytra	13, 5	11
Width of elytra	8	7
Length of fore femora	7	6, 5
„ „ tibiæ	4	3, 5
„ „ hind femora	14	13

One female and two males, taken at Muscat, Arabia, by the late Lt.-Col. A. S. G. Jayakar (British Museum).

There is only one more known species of this genus, in which the spot on the elytra is visible from above; this is the *E. persica* Wern., which is easily distinguished from the new species by the form of pronotal angles and by the structure of the head, as well as by the far smaller dimensions.

2. TARACHODES ARABICUS, n. sp.

♂. Rather small for the genus. Antennæ about twice as long as head and pronotum together. Head broader than pronotum; facial clypeus transverse, entirely flat, its angles rounded, upper carina feeble and not reaching the sides; occiput with two furrows nearest to the eyes rather well developed, while the two intermediate ones are scarcely perceptible. Pronotum about twice as long as it is broad in its widest part which is before its middle, but distinctly behind the transverse sulcus; sides of pronotum parallel, with a feeble excavation before the dilated part and slightly convergent behind it; marginal expansion narrow in prozona and rather broad in metazona, narrowing gradually towards the base of pronotum; transverse sulcus placed near the base of the apical third, its middle part is very feebly developed, while the lateral parts are deeply impressed and strongly curved forwards, with extreme ends almost parallel to pronotal margins; metazona with an oval gibbosity in its fore part; middle sulcus scarcely perceptible, very shallow near the apex and base of prozona, as well as on the fore part of metazona, being entirely undeveloped on the whole basal half of the latter. Elytra longer than the abdomen, subparallel, with apex lanceolate. Wings distinctly shorter than elytra, with apical lobe markedly separated from the rest by an emargination.

General coloration pale greyish. Facial clypeus with a transverse band, upper and lower margins black. Inner side of fore legs rufous, without any black marks. Prosternum with a black transverse band near its base and brownish near the base of fore legs. Elytra entirely hyalinous, veins greyish, with only a few small brownish stripes along veins. Wings hyalinous, with cells of the hind part very feebly infumated.

	♂ (type).	♀ (paratype).
Length of body	32 mm.	34 mm.
Width of head	5	? (mutilated).
Length of pronotum	7, 5	9
„ metazona	5	6
Width of pronotal dilatation	3, 5	4
Length of fore coxæ	5	6
„ „ femora	6	6, 5
„ „ tibiæ	4	5
„ elytra	26	7, 5

	♀ (type.)	♂ (paratype.)
Length of wings	23	?
„ hind femora	7, 5	7, 5
„ hind tibiæ	7	7

The paratypic female differs from male by the broader pronotum, armed with two tubercules, with margins strongly denticulate; by short elytra and by darker general coloration, with well pronounced grey bands on the legs; inner spines of the fore tibiæ are in female entirely black.

Two males and one female in British Museum from Ktubu, Arabia, G. W. Bury.

This species is easily distinguished from all previously known by the coloration of the inside of fore legs and prosternum; these characters seem to be very constant and quite suitable for separating species in this genus.

The new species is the first Asiatic representative of the genus *Tarachodes*, all others being known from Africa.

3. STATILIA OCELLATA, sp. n.

♀: Closely resembles *St. haani*, Sauss., but differs distinctly by the following characters: pronotum with more elongate prozona; pronotal dilatation narrower; prosternum with two whitish ocellar spots, encircled by black; fore coxæ armed with seven spines; elytra extending well beyond apex of abdomen.

Length of body	50 mm.
„ pronotum	18
„ metazona	13, 5
Maximal width of pronotum	4
Length of fore coxæ	12
„ „ femora	15
„ „ tibiæ	4, 5
„ hind femora	17.
„ „ tibiæ	15, 5
„ elytra	39

One female in British Museum from Quetta, Baluchistan (received in 1889 from the Karachi Museum).

4. FISCHERIA INERMIS, sp. n.

♂: Smaller and more slender than any known species. Antennæ very long, setaceous. Head less than twice as broad as pronotal dilatation; facial clypeus transverse, with apex rotundate; occiput convex with two lateral furrows more deeply impressed than two intermediate ones, which are quite shallow; eyes thick, hemispherical. Pronotum slender; its sides slightly expanded, with a few marginal granules in prozona, but without spines and parallel in prozona and in the middle part of metazona, slightly diverging backwards; fore margin elliptical; coxal dilatation placed just behind transverse sulcus; its width is about one-half as much again as the width of pronotum in its narrowest part, which is about the middle of metazona; metazona twice as long, as prozona; median carina placed in a shallow longitudinal sulcus, very feeble in prozona, scarcely perceptible in the fore third of metazona and entirely disappearing in the hind part of the latter. Elytra extending beyond the apex of abdomen. Wings but a little shorter than elytra. Fore coxæ a little longer than metazona of pronotum, not granulated, armed with 6-7 feeble erected spines along the upper carina; fore femora smooth, their armature, as well as that of fore tibiæ presenting no difference from other species of the genus. Hind metatarsus armed with but scarcely perceptible spinules, closely lying down to metatarsus. Supra anal plate a little longer than its base wide, acutely triangular, with apex rounded, lateral margins feebly but distinctly concave, median keel developed in the middle part only. Cerci rounded, rather thick, distinctly longer than supra anal plate. Subgenital plate with its apex triangularly emarginated between short styli.

General coloration grey. Fore coxæ unicolorous, fore femora with three darker coloured bands on the upper side. Pronotum unicolorous, darker than elytra. Elytra with a whitish border along the fore margin of the costal area, interrupted by irregular brownish spots; bases of radial veins pale; a somewhat darker not sharply defined transverse spot in the basal third, followed by a whitish area; the second, larger and more defined whitish spot before the apex, followed by a smaller dark spot; veins darker than cellules, and the whole surface appears, therefore, slightly marmorated; anal area brownish-violaceous, but not so dark as in other species, the colour fading backwards. Wings rather equally infumate throughout the whole surface, the basal part being scarcely more hyaline; transverse venules pale; apex with a common, for this genus white spot, encircled by brownish-violaceous colour.

Length of body	40 mm.
Width of head	5
Length of pronotum	9,5
„ metazona	6,5
Maximal width of pronotum	3,25
Minimal „ „ „	2
Length of fore coxæ	7
„ „ „ femora	9
„ „ „ elytra	30
„ „ „ wings	27
„ „ „ hind femora	13
„ „ „ „ tibiæ	14
„ „ „ „ metatarsi	4,5

The type is unique; it has been taken by G. W. Bury at El-Kubar, S. W. Arabia (British Museum collection).

This new species is easily recognised by its small size, very feebly armed hind metatarsus, not denticulated pronotum and the shape of supraanal plate.

5. Fischeria syriaca, Sauss.

1871. *Fischeria bœtica*, Ramb. var. *syriaca*, Saussure, Mém. Soc. Phys. Genève, xxi, p. 109.

1915. *Fischeria festæ*, Giglio-Tos., Bull. Soc. Entom. Ital., xlvii, p. 22.

Giglio-Tos, in description of his *F. festæ* gives exactly the same differences of it from *F. bœtica*, as Saussure gives for var. *syriaca*; both being of the same origin, it is obvious that they are identical. The same species (or only subspecies of *bœtica*, Ramb.), and not the typical *bœtica*, Ramb., populates all desert parts of S.W. and Central Asia, and all previous records of *bœtica* from those countries must be undoubtedly credited to *syriaca*.

Male of *syriaca*, of which only female has been described by Saussure and Giglio-Tos, differs well from *bœtica* by its larger dimensions, and especially by longer elytra which extend well beyond the apex of abdomen; wings are scarcely shorter than elytra. Dimensions of a male from Mesopotamia are, as follows:—

Length of body	72mm.
Width of head	7, 5
Length of pronotum	18
„ metazona	12
Maximal width of pronotum	5, 5
Minimal „ „	3
Length of fore coxæ	13
„ „ femora	17, 5
„ hind „	21
„ „ „ tibiæ	25
„ „ „ metatarsus	6, 5
„ elytra	48

The specimens studied are from the following localities: Kut and Amara in Mesopotamia; Bushire in S. W. Persia; Aleppo, Syria (in British Museum and in Bombay N. H. Society).

6. MICROTHESPIS DMITRIEVI, Wern.

One male in British Museum from Bushire, S. W. Persia. The species has been described (Ann. Mus. Zool. Petersb., xiii, 1908, p. 120) from Djibouti and Harrar on the Somali Coast.

7. IRIS PERSA, sp. n.

♂. Agrees in all essential characters with *I. oratoria*, L., but differs well from it in the shape of head, pronotum and elytra.

Larger than *I. oratoria* and more robust. Head transverse, a little less than twice as broad as pronotal dilatation; facial clypeus about one and half times as broad as high, with upper keel not sharp, slightly curved, developed in the middle only and disappearing towards the eyes, with short vertical median carina, extending from upper margin to the middle of clypeus, where there are two raised points; other four raised points are at the angles of clypeus. Occiput distinctly convex. Pronotum rather thick; prozona slightly narrowed anteriorly, with parabolic apex, with feeble median longitudinal furrow; metazona about twice as long as prozona, gradually narrowed posteriorly in its fore half, while in the hind half its sides are parallel; margins of pronotum expanded. Elytra extending but a little beyond the apex of abdomen, about three times as long as they are in the broadest part wide; preradial area widened in its basal third and rather suddenly narrowed towards the apex; the venation agrees with this in *I. oratoria*. Wings distinctly shorter than elytra, with apex parabolic; hind margin almost straight. The armure of fore legs much the same as in *I. oratoria*, but the coxæ are more strongly spined and granulated. Supraanal plate rounded; cerci rounded, rather thick. Subgenital plate with hind margin rather broad, slightly convex.

Greenish-pale; fore tibiæ with inner surface reddish; fore metatarsus black beneath. Coloration of wings as in *I. oratoria*.

Length of body	41 mm.
Width of head	6,5
Length of pronotum	13,5
„ metazona	9
Maximal width of pronotum	4,5
Minimal „ „	3
Length of elytra	29
Maximal width of elytra	8,5
Length of wings	24,5
„ „ fore coxæ	9
„ „ femora	11,5
„ „ „ tibiæ	6
„ „ hind femora	11
„ „ „ tibiæ	10,5

Four male specimens in the British Museum from Bushire, S. W. Persia taken in September 1890, by W. D. Cumming.

The most striking differences from *I. oratoria* are: the form of clypeus, which in *oratoria* is more than twice as broad as high, with well developed upper carina; the form of pronotum and especially the relative length of prozona and metazona; the length and form of elytra. Co-typic specimens are of brick-reddish general coloration, but I am not sure that this coloration is natural and not the consequence of immersion in spirit.

8. IRIS SPLENDIDA, sp. n.

♀. About the size of *I. oratoria*, L., but more robust. Antennæ thin, setaceous. Frontal clypeus about twice as broad, as high, flat, with two small

tubercules in its middle, its upper carina not sharp, but fully developed, rounded; vertex with two lateral furrows narrow, but very distinct. Eyes egg-shaped; inner orbits slightly emarginate in upper part. Pronotum rather broad; its margins denticulate; fore margin semicircular; sides in prozona and in metazona parallel; coxæ dilatation but a little wider than prozona, while metazona is distinctly more narrow; prozonal disc very convex, with two small oblique impressions near its apex; its longitudinal sulcus scarcely perceptible in the hind part only; transverse sulcus not interrupted, narrow, but very distinct, straight, with ends directed forwards; metazona twice as long as prozona, less convex, slightly selliform in profile, with two shallow impressions just behind the coxæ dilatation, with middle carina entire, though feeble, better developed in the hind part; the whole surface of pronotum, especially the middle part of metazona, bears scattered small granules; hind margin widely rounded, with slight, but sharp, emargination in its middle. Elytra shorter than abdomen, entirely coriaceous, slightly widened towards the apex, which is very widely rounded. Wings semicircular. Anterior coxæ with numerous densely placed acute tubercles beneath; interior surface with an irregular row of callous tubercles; upper external carina armed with eight obtuse spines, with minute acute spinules, placed in interspaces; upper surface slightly convex, smooth, with a few scarcely perceptible spinules, placed in a longitudinal row along the middle. Fore femora and tibiæ with an armure typical for the genus. Supraanal plate semi-elliptical, feebly carinated along its middle. Cerci short, thick, rounded. Subgenital plate with apex divided in two lobes.

General coloration greyish-yellow. Spines of fore femora and tibiæ brownish, darker towards the tips. Fore tibiæ orange red beneath. Fore metatarsi black on the inside, except the apices. Wings violaceous-black; humeral field rose-violaceous, with an oval black spot near the apex; the whole outer margin with a bright sulphurous border about 2-3mm. broad.

Length of body	48 mm.
Width of head	6
Length of pronotum	12,5
„ metazona	8,5
Width of prozona in its middle	4
„ metazona „ „	3,5
„ „ coxal dilatation	5
Length of elytra	17
Width of elytra in their middle	7
Length of wings	15
Width „ in their middle	12
Length of anterior coxæ	9
„ „ femora	11
„ „ tibiæ	5,5
„ hind femora	10

The type is unique. It was brought home from Afghanistan by Dr. Aitchison of the Afghan Delimitation Commission, but somehow, probably because it had not been set out, it remained unnoticed and was not recorded by W. Kirby, who worked out the collection of the said Commission.* The species is so conspicuous by the splendid coloration of its hind wings, that there is no need for its comparison with other known species of the genus.

9. HESTIASULA BRUNNERIANA, Sauss.

Quetta, Baluchistan, 1 ♀ (British Museum).

The single poorly preserved specimen agrees fairly well with Saussure's original description, as well as with Wood-Mason's drawings (Journ. Asiat. Soc., Bengal.

* Trans. Linn Soc., London, second series, Vol. V, part 3, pp. 137-140.

1884, Vol. liii, pl. xiii, fig. 1a, 1b.) which according to the author (Revis. Mantid., 1889, p. 22) presents the same species. The drawing of the head is, however, not quite exact, since it presents the lower surface of frontal appendix as convex, while it is entirely flat, as rightly described by Saussure. This species has been known from Sylhet, Calcutta and Mysore; Quetta is, therefore, the most north-western known point of its distribution.

10. BLEPHAROPSIS MENDICA NUDA, Giglio-Tos.

1917. *Blepharopsis nuda*, Giglio-Tos, Bull. Soc. Ent. Ital., xlviii, p. 70 (of separate copy.)

Numerous specimens in British Museum from Arabia, Sinai, Mesopotamia, Quetta, etc.

The characters of *nuda* are not quite constant; especially variable and not characteristic for *nuda* is the degree of hairiness of the pronotum, on which Giglio-Tos has based his species. On the other hand the form of femoral lobes, specially those of middle femora, is rather constant: while in typical *mendica* (from Portugal, Canaries) these lobes are scarcely denticulate at all, the specimens from Desert Asia have the lobes strongly spined. As this character is, however, also liable to individual variation, I think it more right to regard *nuda* as but an Eastern geographical race of *mendica*.

Phasmidæ.

11. BURRIA LONGIXIPHA, Br. Watt.

Aden, Arabia, 1 ♀ (British Museum).

The genus and this species has been hitherto known from the African Coast of the Red Sea.

Locustidæ.

12. ACRIDIUM SUBULATUM, L.—Baghdad, ii. 17 (Bombay N. H. Society).

13. ACRIDELLA ROBUSTA, Uvar.—Persia: Pusht-i-koh, Chekerava, 540 m. above sea-level, 1907, de Morgan (Paris Museum).

14. ACRIDELLA MINIATA, Kl.—Amara, Mesopotamia, viii-ix. 16, Lt.-Col. F. P. Connor (Bombay N. H. Society).

15. ACRIDELLA ANTENNATA, Krauss.

One male and two females were taken at Ktubu, Arabia, by G. W. Bury.

The species is easily recognised by its very long antennæ and strongly attenuate hind angle of pronotum, apart from the peculiar dark coloration of wings.

16. PLATYPTERNA TIBIALIS, Fieb.—Arabia, Percival and Dodson, 2 ♂ ♂, 2 ♀ ♀, (British Museum).

17. PLATYPTERNA PICTIPES, sp. n.

♀. Of medium size for the genus. Antennæ rather short (their exact length unknown, the tips being broken), moderately compressed and widened in basal part.

Front moderately reclinate, smooth, but not shining; frontal ridge parallel, slightly dilated near the ocellum, gradually and very feebly widened towards the clypeus; fastigium of vertex seen in profile subequal to one-half of the length of an eye; foveolæ reniform, rather broad, curvate, not strongly impressed, with margins rounded, the upper margins being especially obtuse and low, while the lower ones are better developed; vertex seen from above obtuse, rotundato-triangular at the apex, as broad, as long, convex, with thick, but very low, shining median carina. Eyes oval, oblique. Pronotum feebly, but distinctly constricted in prozona; lateral keels parallel between the fore margin and the second transverse sulcus, gradually diverging behind the latter, slightly convex in about the middle of metazona; median keel sharp, straight, interrupted by the third sulcus; metazona distinctly shorter than prozona, distinctly convex and raised above the level of prozona; hind margin obtusely angulate, with the angle itself not rounded; lateral lobes rather convex, narrowed downwards, with fore margin slightly sinuate, lower margin feebly bisinuate, with a very

minute obtuse angle in the middle, hind margin straight, feebly sinuate; fore and hind angles of lobes a little more than 90, rounded. Elytra very long, parallel-sided. Hind femora moderately broad, rather robust, subapical filiform part not developed.

General coloration is that of sand. Head with small brownish spots, forming two occipital and two postocular stripes. Pronotum with lateral keels shining, paler than disc; lateral lobes darker along their upper margin and with a narrow whitish border beneath. Elytra sand-coloured in the basal fifth part and colourless in the rest, with a longitudinal row of brownish spots in the intercalate area and 3-4 smaller and more feebly coloured spots in the apical third, just behind the second radial vein; several feebly coloured spots are also scattered on the whole apical half of elytra; all veins and venules are sand-coloured with small irregular darker knots. Wings hyalinous; veins, especially near the apex, brownish. Hind femora with superno-median area of the general coloration, while the externomedian area is whitish; inner surface unicolorous; inner genicular lobe with a round dark-brown spot. Hind tibiæ violaceous, their upper surface paler, especially towards the base; spines pale basally, with brown tips.

Length of	body	33, 5 mm.
,,	pronotum	6
,,	elytra	30, 5
,,	hind femur	15, 5

Type: Muscat, Arabia, G. Jayakar.

This species seems to be related to *P. geniculata*, Bol. (Novit. Zool., *XX*, 1917, p. 608, No. 9) from Algerian Sahara, but it is well characterised by the structure of frontal ridge, foveolæ of vertex, shape of pronotum and coloration of hind tibiæ.

18. Dociostaurus crassiusculus, Pant. (=*hauensteini* Bol.).—Persia: Poush-e-kouh, Arkovaz, J. de Morgan, 1904 (Paris Museum).

19. Dociostaurus maroccanus, Thunb.—Persia: Abadeh, Peter Paschen (Bombay N. H. Society).

20. Ramburiella truchmana, F. W.—Syria, Aleppo, F. G. Aldous (British Museum).—The genera *Ramburiella*, Bol. and *Pallasiella*, Kirby, are evidently identical, since *Ramburiella hispanica*, Ramb. and *Pallasiella truchmana*, F. W., are undoubtedly congeneric. As Bolivar's name for the genus is the oldest of the two, the genus must be called *Ramburiella*, and it includes three species: *R. hispanica*, Ramb., *R. truchmana*, F. W. and *R. bolivari*, Kuthy.*

21. Æolopus thalassinus, Rossi.—Baghdad, ii., 17 (Bombay N. H. Society).

22. Æolopus strepens strepens, Latr.—Syria, Aleppo, F. G. Aldous; Baghdad (British Museum); Persia: Susa, J. de Morgan (Paris Museum).—This Mediterranean species has never been previously recorded from the Desert subregion and its occurrence in Baghdad and Susa in the typical form is quite interesting, since in S. W. Persia another race occurs, which is described below.

23. Æolopus strepens desertícola, subsp. n.

Differs from the typical Mediterranean form in the following characters:—

Pronotum more distinctly constricted, less convex above; elytra somewhat longer; general coloration brownish-grey; elytra with wider light transverse bands: wings feebly infumate apically; hind femora with black points along the lower carina of the area externomedia and with three indistinct fasciæ in the same area; inner side of femora pale with two black fasciæ; hind tibiæ bluish with black base, and a pale subbasal ring, followed by a dark grey ring.

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* Described as *Stethophyma bolivari* Kuthy (Ann. Mus. Hung., 1907, p. 431), and again by me as *Arcyptera elegans*, Uvar. (Horæ Soc. Entom. Rossicae, Vol. 39, 1910, p. 370; see also Bull. Mus. Caucase, xii, 1919, p. 156); this species is very closely related to *R. hispanica*, Ramb. and is possibly but a geographical race of the latter

		♀
Length of body	.. ..	20 mm.
„ pronotum	.. ..	4
„ elytra	.. ..	19, 5
„ hind femur.	.. ..	12

Described from one male specimen, taken at Kazvin, N. W. Persia, 25, viii, 19, by P. A. Buxton.*

24. LERINA ÆOLOPOIDES, sp. n.

♂. Of the size of *L. œdipodioides*, Bol., but more compressed laterally. Antennæ very feebly flattened and scarcely dilated apically. Head in profile distinctly reclinate; frontal ridge gradually, though feebly, widened towards clypeus, shallowly, but distinctly, impressed, with margins raised, rather sharp; facial keels raised, almost straight. Fastigium of vertex distinctly longer than broad, pentagonal, with apex much attenuate, acute; lateral margins raised, sharp, the anterior ones feebly concave; surface very feebly sloping forwards, slightly concave. Temporal foveolæ elongate, strongly narrowed anteriorly, triangular, feebly curvate, shallow, with raised margins. Eyes slightly higher than broad, less rounded anteriorly than posteriorly. Occiput with its surface uneven. Pronotum distinctly constricted laterally, much alike in its shape to that of *Æolopus strepens*. Latr.; disc subtectiform, feebly narrowed anteriorly; median keel raised, slightly lowered behind the first transverse sulcus, interrupted by the hind sulcus, which is placed distinctly before its middle; metazona with its hind angle acute; lateral keels scarcely perceptible in the fore part of prozona, very obtuse in metazona; lateral lobes higher than long, with their lower margins oblique in the fore part; their fore angle obtuse, hind angle straight, widely rounded. Elytra with the fore ulnar vein sinuate; false vein in discoidal area thick, distinctly transversely serrulate, approaching apically to the hind radial vein; interulnar area more than twice as broad as the discoidal area, with the false vein distinct only near the base of the area, the rest of the latter being irregularly reticulated; furcal branches of the ulnar vein, as well as the false vein in the interfurcal area and transverse venules in the same area, are distinctly thickened, callous.

General coloration reddish-sandy with black and grey points and designs. Antennæ unicolorous. Face whitish; frontal and facial keels with black longitudinal spots. Pronotum with numerous blackish points. Elytra with three broad castaneous fasciæ: sub-basal, median and pre-apical, all reaching the anal area, but not extending into it; interspaces between the fasciæ whitish; apex hyaline; anal area sandy. Wings feebly greenish basally, with an indefinite infumate preapical fascia, not reaching the inner margin. Hind femora outwardly reddish-sandy in the basal half and blackish apically, with a reddish ring before the knee; innerside and lower sulcus totally black, except a pale preapical ring; knees blackish, except the reddish upside. Hind tibiæ black, with apex and a narrow subbasal ring ivory white. Hind tarsi ivory white, with second joint brownish. Abdomen reddish with 3-6 segments black laterally.

Length of body	.. .. 16, 5 mm.
„ pronotum	 4
„ elytra	 18
„ hind femur	.. .. 9, 5

The unique specimen of this species has been taken by A. S. G. Jayakar at Muscat, Arabia (British Museum). It is with some hesitation that I put this species into the genus *Lerina*, Bol., which has been described from one Indian

* Specimens of this race recorded by me (Journ., Bombay N. H. Soc., Vol. xxvii, 1921, p. 804) from Mesopotamia, seem to belong to a distinct species, which I am unable to identify with certainty now, owing to scarcity of material.

species—*L. œdipodioides*, Bol. The new species itself is very striking by its close resemblance to *Æolopus strepens*, Latr., by venation of elytra and by coloration of the same and of hind legs.

25. LERINA BUXTONI, sp. n.

♂, Of the size and habitus of the Indian *L. œdipodioides*, Bol. Antennæ slightly flattened, feebly dilated towards the apex; last joint truncate. Front in profile distinctly reclinate; face impresso-punctate; frontal ridge subparallel, rather suddenly narrowed near fastigium and very feebly widening towards clypeus, not reaching the latter, flat, with a small impression below the ocellum, with lateral margins obtuse; facial carinæ obtuse, rather thick, feebly curvate, Vertex slightly sloping; fastigium much longer than broad, elongato-hexagonal, narrowly truncate anteriorly, slightly concave, with raised margins; foveolæ long and straight, strongly narrowed anteriorly, almost triangular, shallow, with margins not sharply delineate. Eyes almost vertical, distinctly higher than broad, with fore margin straight. Pronotum feebly constricted and rounded in prozona, which is distinctly longer than metazona; median keel in prozona scarcely distinct, interrupted by two transverse sulci, in metazona sharp, though low; lateral keels in the shape of small, low tubercules near the fore margin of prozona and very obtuse in metazona; fore margin of the pronotal disc slightly prominent, with a small emargination in the middle; hind margin obtusely angulate, widely rounded; lateral lobes much higher than long, with lower margin oblique in its fore part, fore angle obtuse, hind angle about 90° rounded. Elytra extending beyond the hind knees; interulnar field about twice as broad as discoidal, with an irregular false vein; intercalate vein in discoidal area approaching apically to the radial vein; two furcal veins and the false vein in the furcal area, as well as transverse venules in the same area thick, callous. Venation of wings as in *L. œdipodioides*, Bol. Hind femora short, broad; hind tibiæ shorter than femora.

General coloration is that of sand, with numerous greyish and blackish points. Antennæ brown with numerous pale rings. Pronotum above brick-reddish, with two indefinite blackish longitudinal sinuate fasciæ. Elytra with three irregular blackish bands and scattered brownish-grey spots. Wings hyalinous, very feebly coerulescent basally. Fore and middle legs with several brown transverse fasciæ. Hind femora with two irregular transverse fasciæ in area externomedia and with three on the upper side; inside black, except a post-median and a preapical pale fascia; knees black from inside and grey outwardly. Hind tibiæ ivory white, with base, median and preapical rings, and tips of spines, black.

Length of	body	19, 5 mm.
,,	pronotum	3, 5
,,	elytra	19
,,	hind femur	9, 5

The unique type specimen has been taken by P. A. Buxton at Amara, Mesopotamia, 10. viii, 18, together with a paratypic male, which agrees with the type in all morphological characters, but has the elytra unicolorous, without any trace of fasciæ or spots.

26. ŒDALEUS NIGROFASCIATUS, De Geer.—Persia: Bakhtyari Mountains, 1500-4500 m., J. deMorgan, 1904 (Paris Museum).

27. SCINTHARISTA NOTABILIS BRUNNERI, Sauss.

1884. *Scintharista brunneri*, Saussure, Prodr. Oedipod., p. 121, No. 1.

1888. *Quiroguesia brullei* var. *blanchardiana*, Saussure, Add. ad Prodr. Œdipod., p. 35.

The most careful examination of the cotypes of *blanchardiana*, Sauss., which are in British Museum, and comparison of them with original description of *brunneri*, Sauss., leaves no doubt in the identity of this form. It is evident, therefore, that the genera *Scintharista*, Sauss., and *Quiroguesia*, Bol., are identical

and Saussure's name has priority. I consider the Asiatic *Sc. brunneri*, Sauss., as a mere geographical race of the Western Mediterranean *Sc. notabilis*, Walk. (=*brullei*, Sauss.), the difference between them being too insignificant for separation of species. This race occurs in two different colour forms, which might be taken together, one with rose wings and another with yellow wings; it is distributed all over the deserts of S. W. Asia. from North Kashmir and Bombay to Ordubad in Transcaucasia and to Southern Arabia, occurring even at Massowah, on the African Coast of the Red Sea.

Specimens in British Museum are from following localities:—Aden, Arabia (Co-types of *blanchardiana*, Sauss).; Muscat, Dr. Jayakar; Malakand, N. India, A. Begbie; Campbellpore, N. India; Hunza, N. Kashmir; Quetta, Baluchistan. In the Bombay Natural History Society there is one female from Teghab Kelat, Baluchistan, 28, viii, 17, J. E. B. Hotson.

28. MORPHAERIS FASCIATA, Thunbg., ab *sulcata*, Thunb.—Syria, 1 ♂ (British Museum).—Full synonymy of this species is given by me in another paper on the Indian Orthoptera. Annals and Magazine of Natural History, 1921, p. 488).

29. MIOSCIRTUS WAGNERI Ev.—Fao, Persian Gulf, v., 91, W. D. Cumming, 2 ♀ ♀.—Specimens from Mesopotamia and Southern Persia are somewhat larger than those from the original locality of the species, which is Sarepta, North from Caspian Sea; if this difference proves to be constant in large series of specimens, a distinct southern geographical race may be distinguished, which might be called subsp. *rogenhoferi*, Sauss. (described as *Conozoa rogenhoferi*, Sauss.).

30. PYRGODERA ARMATA, F. W.—Jebel-Hamrin, River Diala, Mesopotamia, vii, 18, 1 ♂, H. D. Piele; Bakhtyari, W. Persia, 29, vi. 11, 1 ♂, G. B. Scott (British Museum); Abadeh, W. Persia, P. Paschen (Bombay Society); Eivar-i-kerkha, Persia, iv. Vol. 1907, I. deMorgan (Paris Museum).

31. SPHINGONOTUS SAVIGNYI, Sauss.—Abadeh, Persia, vii-viii, P. Paschen (Bombay Society).

32. SPHINGONOTUS BRUNNERI, Sauss.—Abadeh, Persia, vii-viii, 1 ♀, P. Paschen (Bombay Society).

33. SPINGONATUS BALTEATUS, Serv.—Abadeh, Persia, vii-viii, 1 ♂, 2 ♀ ♀, P. Paschen (Bombay Society).

34. SPHINGONOTUS OCTOFASCIATUS, Serv.—Abadeh, Persia, v-vi, 2 ♂ ♂, 3 ♀ ♀, P. Paschen (Bombay Society).

35. HELIOSCIRTUS MOSERI, Sauss.—Benn-Chah-Bah, Baluchistan, 20. viii. 17, 1 ♀, J. E. B. Hotson (Bombay Society).

IRANELLA, gen. nov.

General habitus not unlike that of *Sphingonotus*, but elytra and wings only half developed.

Head rather large and thick. Front vertical; frontal ridge above ocellum flat, broad, strongly punctured, below ocellum suddenly depressed and narrowed, with lateral margins raised, and totally disappearing half-way between ocellum and clypeus; face broad; facial keels strongly raised, rather thick, vertical, diverging downwards; lateral ocelli touching the eyes and lateral margins of fastigium; fastigium strongly sloping, slightly convex, strongly rugose, with a short median sulcus which is widened anteriorly, then narrowed again and passing gradually into frontal ridge; vertex between the eyes slightly concave, broad, with lateral margins straight, parallel, with a low median carinula, bifurcate anteriorily, very narrowly sulcate and extended into the occiput, the latter strongly rugose. Pronotum in prozona constricted and cylindrical intersected by three deep transverse sulci, the second one being bifurcate in that disc, so that the latter is intersected by four sulci; lateral keels in prozona distinct, but interrupted in the middle; metazona equal in length to prozona, slightly convex, strongly rugose and densely covered with small tubercules, while tubercules in prozona are large, but not densely placed; median carina in prozona replaced by a scarcely perceptible sulcus, while in metazona it is

well developed, very thin, linear; hind angle of metazona straight, rounded; lateral lobes about as long as high, strongly widened upwards, their fore margin slightly sinuate, lower margin oblique and very feebly sinuate in the fore part, hind margin very oblique, almost straight; hind angle obtuse, rounded; prozona in lateral lobes more than twice as long as metazona. Prosternum with its fore margin produced in a large, trapezoidal collar, widened and slightly bisinuate apically, with outer angles a little less than 90°. Pectus very broad; mesosternal lobes trapezoidal, a little broader than long, with inner and hind margins straight, inner angles sharp, about 90°; mesosternal interspace broader than long; metasternal lobes extremely short, their interspace equal in breadth to the mesosternal one. Tympanum very large, oval. Fore and middle tibiæ armed with 2-3 small spines both on outer and inner side near the apex. Hind femora rather short, thick, with upper carina denticulate; lower carina not widened, almost straight. Hind tibiæ slightly incurved and widened towards the apex, with 9 inner and 8 outer spines, without subapical spine on the outside; outer spures twice as short as the inner ones. Elytra just a little longer than abdomen, coriaceous, rugose, with the fore margin gradually rounded, hind margin almost straight, apex widely rounded; veins rather irregular, sinuate; pre-radial area broad; discoidal area open with an irregular intercalate vein; anterior ulnar vein straight, reaching the apex of elytra; anal area almost equal in breadth to one-half of the whole elytra. Wings shorter than elytra, circular.

Genotype: *Iranella eremiaphila*, sp. n.

36. IRANELLA EREMIAPHILA, sp. n.

♂: Greyish ochraceous, with whitish and grey marks. Elytra beneath with several confluent round black spots in the pre-radial area and four smaller and lighter coloured ones in discoidal area; all these spots are slightly conspicuous (grey) on the upper side; the hind radial and humeral veins, as well as all transverse venules of the anal field bluish-black on the lower side, but not distinctly coloured on the upside of elytra; hind femora slightly rose in the basal half of the inner side, with two scarcely perceptible greyish transverse fasciæ in area extreno-media; knees grey. Hind tibiæ bluish-grey in the basal half, slightly rose apically, with spines sanguineous, black tipped.

Length of body	15 mm.
,, pronotum	5, 5
,, elytra	11
Maximal width of elytra	5
Length of hind femur	10

The type of this striking insect is unique. It has been taken by P. Paschen in Abadeh, Persia, vii-viii, 1916.

This insect somewhat resembles *Sphingonotus* in the shape of the head and pronotum, but the disc of the latter is intersected by four sulci; short elytra and wings give it a general appearance quite unlike any other genus of *Œdipodinæ*. The black spots on the underside of elytra remind one of the Mantid genus *Eremiaphila*; their biological meaning is quite incomprehensible without a careful study of the biology of the insect in its natural surroundings.

37. ŒDIPODA GRATIOSA, Serv.—Persia; Abadeh, vii-viii. 16, P. Paschen (Bombay N. H. Society).

38. ACROTYLUS LONGIPES, Charp.—Arabia: Muscat, 1 ♂, A. S. J. Jayakar (British Museum).

39. ACROTYLUS INSUBRICUS, Scop.—Persia: Abadeh, vii-viii, 16, P. Paschen (Bombay N. H. Society).

40. TMETHIS CISTI, F.—Syria: Aleppo, F. G. Aldous (British Museum).

41. TMETHIS SAUSSUREI, Uvar., ab. VIOLACEA, n.—Differs from the typical blue-winged form only by the violaceous colour of wings, all morphological

characters, as well as dimensions, being the same. Types and several cotypes from Abadeh, Persia, P. Paschen (British Museum and Bombay N. H. Society).

42. TMETHIS HOTSONI, sp. n.

♀. Large, laterally compressed. Head narrow, prominent above pronotum; front reclinate; frontal ridge expressed above ocellum only, totally and abruptly disappearing below it; fastigium of the vertex strongly sloping, longer than broad, slightly widened anteriorly, transversely rugose; eyes very prominent, oval; occiput with an irregular median carina. Pronotum laterally compressed, especially so in prozona, which is considerably narrower and shorter than metazona; prozona strongly tectiform, with median crista thick, deeply intersected by three transverse sulci, the hindmost of which is especially deep; metazona as high, as prozona, thick, tectiform in its fore half, with thick elevated carina, which disappears on the apical third; hind angle acute, rounded; lateral lobes much higher, than long, with fore margin slightly sinuate; lower margin sinuate anteriorly; hind angle of lobes straight, rounded; whole pronotum is covered with rather large, but not dense callous tubercules; metazona rugulose. Elytra very long, extending far beyond hind knees. Hind wings a little shorter than elytra. Mesosternal lobes nearly triangular, their inner margins being strongly oblique; interspace much broader, than long. Metasternal lobes widely separated. Hind femora elongate, granulose, with upper margins slightly undulate; lower margin straight. Second abdominal segment raised posteriorly in a rather thick median protuberance.

General coloration whitish-grey; pronotum feebly brick-reddish. Elytra ochraceous-grey, with indistinct grey marks. Wings light greenish-blue, with a 4-5 mm. wide black band, which starts from the middle of fore margin and runs straight backwards to the hind margin but does not reach it by about 5 mm., suddenly turning under a straight angle inwardly and reaching the inner margin; two apical lobes brown. Hind femora coeruleous beneath, light blue inwardly, with inner knee lobes dark blue. Hind tibiæ with inner and upper surfaces blue, with a pale ring near the base and a red apical spot. Abdomen pale with hind margins of basal tergits blue-black.

Length of	body	65 mm.
„	pronotum	14
„	elytra	56
„	hind femur	24

The female of this species has been taken by Lt.-Col. J. E. P. Hotson in Mand, Baluchistan, 29, iv. 1916, on sand; it bears the remark, "plentiful," but only one rather damaged specimen has been included in collection sent to British Museum by the Bombay Society. The species belongs to the group of *T. gibber*, St., but is bigger, more constricted laterally, with longer elytra, than any other known species, and is also easily recognised by narrow band of wings, bent under a right angle.

43. PŒCILOCERUS VITTATUS, Klug.—Arabia: Aden, Ktubu (British Museum).

43*a*. PŒCILOCERUS VITTATUS var. CALOTROPIDIS, Karsh.—A very large series of specimens in British Museum from Hadramaut, Arabia.

44. PŒCILOCERUS PICTUS, F.—Baluchistan: Quetta (British Museum); Ormarah, W. Cumming; Nal, 21, ix. 17 and Greshag-Kalat, 28, viii, 17, J. E. B. Hotson (Bombay N. H. Society).—These are the most north-western records of this Indian species.

44*a*. PŒCILOCERUS BUFONIS, Klug. and ab. *vulcania*, Serv.—Very numerous specimens in Paris Museum from Sinai, J. Couayt, 1908, belonging both to typical form and entirely black ab. *vulcania*, together with several of intermediate coloration.

45. PŒCLILOCERUS ARABICUS, sp. n.

♂. Size rather small for the genus. Antennæ feebly flattened, distinctly longer than head and pronotum together. Front not very oblique, scarcely concave

in profile; frontal ridge between antennæ strongly compressed, very narrowly sulcate, the sulcus slightly widened towards ocellum, suddenly narrowed below it, gradually widened and becoming more shallow towards the clypeus, not reaching the latter; lateral facial keels more raised near the eyes, lowered below their middle. Fastigium of vertex attenuate, convex, rugosely punctate, with apex deeply furrowed. Eyes very prominent, short, oval. Occiput with a low median carina. Pronotum short, convex, its whole surface feebly coriaceous; transverse sulci very feeble; median carina undeveloped in prozona and scarcely perceptible in metazona; the latter a little shorter, than prozona; hind margin very widely rounded; lateral lobes with fore angles very obtuse, hind angles obliquely truncate. Elytra narrow, extending a little beyond hind knees, marginal field feebly widened basally and gradually narrowed towards apex, the basal dilatation being, therefore, not as well marked, as in most other species of the genus; apex of elytra elliptical. Wings shorter than elytra, with disc coloured. Hind femora slender, narrow. Supraanal plate obtusely triangular. Cerci short, slightly compressed, obtuse. Subgenital plate thick, rounded, carinated apically.

General coloration grey. Antennae with basal joints blackish, with apical two-thirds irregularly annulated with brown, black and pale rings; apical joints black. Face pale-brownish. Fastigium blackish from above. Occiput of darker shade than the cheeks. Pronotum unicolorous grey, with hind margin narrowly shining black. Mesonotum and metanotum bluish-black. Elytra ash-grey, with numerous orange-yellow speckles. Wings rose, except the apex and hind border, which are hyalinous; veins in apical part brownish. Abdomen dirty-yellow, with brown rings at the base of each segment. Fore and middle legs uniformly brownish-grey. Hind femora grey on the outside and black inwardly. Hind tibiæ dark violaceous, with base almost black; spines pale with black tips. Two basal joints of hind tarsi pale with brown spots; last joint violaceous.

Length of	body	33 mm.
,,	antennæ	12, 5
,,	pronotum	7
,,	elytra	25, 5
,,	hind femur	15

Arabia: Ktubu, G. W. Bury, 1 ♂ (British Museum).

This species is very well characterised by its coloration, as well as by morphological features, the shortness of pronotum and form of elytra rendering the best characters for separating it from its related species.

46. PYRGOMORPHA CONICA, Ol.—Amara, Mesopotamia, F. P. Connor (Bombay Society).

47. TROPIDAUCHEN ESCALERAI, Bol.—Persia, 1 ♀ (British Museum). This species differs from *T. securicollis*, Sauss. by but unimportant characters and is, probably, only a geographical form of the latter species.

48. TROPIDAUCHEN CULTRICOLLE, Sauss.—Afghanistan: Hari-rud valley, 1 ♂, 1 ♀, 1 larva; Badghis, 1 larva (British Museum).—These specimens have been recorded by Kirby (Trans. Lin. Soc. London, Zool. v, 3, p. 139, No. 11) as *Eunapius granosus*, Stal.

49. DERICORYS ALBIDULA, Serv.—Persia: Fao, 1891, W. Cummings (British Museum).

1839. *Dericorys albidula*, Serv., Ins. Orth., p. 639.
1853. *Cyphophorus tibialis*, Fieber, Lotos, iii, p. 121, No. 2.
1875. *Derocorys acutispina*, Stal, Bih. Sven. Akad., iii (14), p. 27, No. 1.
1889. *Derocorystes curvipes*, Redt., Wien Ent. Ztg., viii, p. 29, No. 5.
1913. *Dericorys albidula*, Bolivar, Novitates Zool., xx, p. 613, No. 23.

I am fully convinced by the most careful study of descriptions of all above quoted species, that there exists only one large species of *Dericorys*, which is

distributed from Transcaspia to Sahara and from Persian Gulf to Syria. The characters given by Bolivar (l.c.) as separating *albidula*, Serv., from *curvipes*, Redt., are not specific but individual.

50. TROPIDOPOLA OBTUSA, sp. n. (fig. 2).

In studying a rather extensive series of *Tropidopola* (12♂♂, 13♀♀) taken in different parts of the Desert region, and comparing these specimens with those of *Tropidopola cylindrica*, Marsh, from Greece and Macedonia, I came to the conclusion that the desert species is not *cylindrica*, as it has been identified by all authors, including myself, but is well distinct from it. As it, however, agrees with *cylindrica* in all characters, except structure of the head, which is quite different and very constant throughout the series, I think it unnecessary to give a full description of the new species, and the following key together with drawings must be sufficient for separating it from *cylindrica* :—

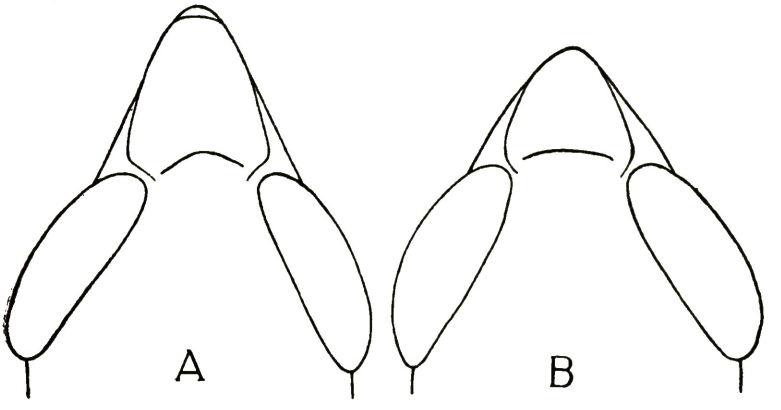

Fig. 1. A. *Tropidopola cylindrica*, Marsh.
B. *Tropidopola obtusa*, sp. n.

1 (A) Head not thicker than pronotum, gradually narrowed anteriorly. Front long, more reclinate, in profile quite straight; frontal carinæ straight, converging gradually towards fastigium. Fastigium of vertex (fig. 1) distinctly longer than its base wide; its sides straight, apex subacute. Eyes more elongate. Antennæ distinctly flattened with median joints subquadrate.....*T. cylindrica* Marsh.

2 (B) Head a little thicker than pronotum. Front shorter, less reclinate; in profile slightly convex; frontal carinæ subparallel, suddenly converging between the base of antennæ and fastigium. Fastigium of vertex (fig. 2) not longer than its base wide; its sides convex; apex rounded. Eyes shorter and broader. Antennæ scarcely flattened with median joints distinctly longer than wide. Length of body of the type (female) 35mm.; of pronotum 6, 5; of elytra 26; of hind femur 14, 5.....*T. obtusa*, sp. n.

The type is from Qualat-Salah, Mesopotamia, 6, i., 1918, P. A. Buxton. Other specimens of *T. obtusa* studied by me were from following localities:—

Mesopotamia: Amara, Basra, P. A. Buxton; S. Persia: Fao, D. Cummings, River Karun, Mohamarra, K. C. Mabbs (British Museum); Susa, J. deMorgan (Paris Museum).

Two specimens taken by Dr. Buxton in Mesopotamia (1♂ from Basra, 12, viii, 18 and 1♀ from Amara, 18, vii, 18) differ from all others by their light green coloration, which is more fresh in ♀, while the male is slightly brownish from above; both specimens are also larger than usual, and have longer antennæ

consisting of more elongated joints, than may be seen in typical specimens of *obtusa*. Without studying a larger series of this form, I cannot decide whether those characters are sufficiently constant to be specific, and I propose in the meantime to designate it as var. VIRESCENS; n. The dimensions of the typical specimen (female from Amara, Mesopotamia) are, as follows :—Length of body 39 mm.; of pronotum 7 ; of elytra 28 ; of hind femur 16, 5.*

51. THISŒCELRUS (?) MORBOSUS, Serv.

1839. *Acridium morbosum*, Serville, Ins. Orth., p. 682, No. 44.

1870. *Caloptenus cincticollis*, Walker, Cat. Derm. Salt. Br. Mus. iv, p. 689, No. 29.

There is no doubt though the types of *cincticollis*, Walk., are lost, that this species is identical with *morbosum*, Serv., both insects having been described from Sinai ; I have seen two females from the same locality : Sinai, J. Couayt, 1909 ; desert Arabique, Mahamadieh, canal de Suez (Paris Museum). In British Museum there is one female of this species, which is labelled " Spain" which is doubtless wrong and due to some mistake in labelling. I am not quite sure, whether the species belongs to *Thisœcetrus*, where it is included by some authors, but the question cannot be decided, until male specimens are studied.

52. SPHODROMERUS CŒLEOSYRIENSIS, Giglio-Tos (Fig. 3c, 4c.).

1893. *Caloptenus cœlesyriensis*,Giglio-Tos, Boll. Mus. Zool. An. comp. Torino, viii, N. 164, p. 10, No. 51, fig. 4.

1914. *Calliptamus italicus*, L. ab. *carbonaria*, Uvar., Revue Russe d'Entom., xiv, p. 10.

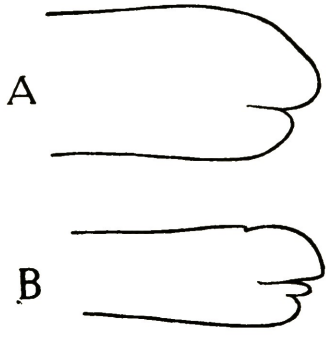

Fig 2. *Tips of the male cerci.*
A—*of Calliptamus cœlosyriensis*, G. T.
B—*of C. italicus, L.*

Shortly after I described *carbonaria* I had the opportunityof stud ing extensive series of the same insect from different localities in Transcaucasia, Persia and Kurdistan, as well as of making some field observations on living insects, which enables me to state, that it is quite a distinct species from *italicus*, L. The examination of a single male in British Museum from Syria (Aleppo) enables me to identify *carbonaria* with *cœlesyriensis*. The species is rather variable in the development of lateral keels of pronotum and, as its coloration also varies from pitch-black to reddish-grey or clay-yellow, it might be mistaken for *italicus*. It differs, however, from the latter species by shorter and broader hind femora, and, more distinctly, by the shape of end of male cerci, which in *italicus* is armed with two small teeth under the apical lobe, while in *cœlosyriensis* there is only one tooth ; these differences are clearly shown in figures (see fig. 2). This species is distributed from Syria to Turkestan (Ferghana) and from S. E. Transcaucasia to Central Persia (Teheran, in Caucasian Museum ; Pusht-i-Kuh, Paris Museum).

53. THISŒCETRUS ADSPERSUS, Redt.—Mesopotamia : Sinn-Abtar, vii, 16, Shortridge ; Amara, viii-ix, 16, Connor ; Baghdad, 13, ii.17 (Bombay Society).

* Specimens of *Tropidopola* from Algeria, whence I have studied only three examples, are more alike *obtusa*, than *cylindrica* in the shape of fastigium, but they differ by the frontal carinæ being gradually convergent, as in *clylindrica*. I propose to regard the Algerian *Tropidopola* as a geographical race of the desert *obtusa*, under the subspecific name *algeriana*, subsp. nova (type from Biskra, Algeria, W. I. H. King.)

54. THISŒCETRUS DORSATUS, F.-W.—Mesopotamia: Sinn.-Abtar vi, 16, G. C. Shortridge (Bombay Society).

55. THISŒCETRUS PULCHER, Bol.—Baluchistan: Gaza Kalah, 1, ix, 1917, J. E. B. Hotson (Bombay Society).—The species belongs to Indian fauna and this is the most north-western record of its occurrence.

Tettigoniidæ.

56. EURYCORYPHA STYLATA, St.—El-Kubar, N. W. Arabia. G. W. Bury, 2 ♂ ♂ (British Museum).—The genus is essentially African in its distribution and the species is African, as well.

57. EUCONOCEPHALUS INCERTUS, Walk.

1869. CONOCEPHALUS INCERTUS, Walk.—Cat. Derm. Salt. B.M., ii, p. 320.

1891. CONOCEPHALUS BREVICEPS, Redt.—Verh. Zool.-Bot. Ges. Wien, p. 417.

To this species must be partly referred records on the occurrence in the deserts of S. W. Asia of *Hom. nitidulus*, Scop. The above synonymy is established by me after comparison of Redtenbacher's description with Walker's types of *incertus*. I have seen the specimens from the following localities:—Arabia: Fao, 27, x., 91, 1 ♀; Aden, 16, iii, 95, 1 ♀; Mesopotamia: Amara, P. A. Buxton. 1 ♀ (named by L. Chopard as *nitidulus*, Scop); Baluchistan; Omarah, W. D. Cummings, 1 ♀ (all in British Museum).

58. XIPHIDIUM FUSCUM TURANICUM, Sem.—Amara, Mesopotamia, viii-ix, 16-30, v. 17, F. P. Connor (Bombay Society).

59. DECTICUS ALBIFRONS, Cyr.—Mesopotamia: Amara, vii., 16, F. P. Connor; Sinn-Abtar, vii, 16, G. C. Shortridge.

60. TRIGONOCORYPHA ANGUSTATA, sp. n.

♀: Fastigium of vertex triangular, with middle sulcus broad and deep, open anteriorly. Pronotal disc rugulose, very feebly convex anteriorly and as feebly concave posteriorly; fore margin rotundately concave; hind margin circular with a very small emargination in its middle; lateral carinæ straight, feebly convergent anteriorly, more distinctly serrulate in prozona, than in metazona; transverse sulcus feeble, curved backwards in the middle, placed at the end of the basal third; lateral lobes forming a right angle with disc, distinctly higher than long; their fore margin very feebly concave, lower and hind margin widely rounded. Elytra reaching well beyond hind knees; marginal field strongly widened, but near its apical third rather suddenly narrowed, fore margin being distinctly concave and the apex of elytron lanceolato-attenuate; radial veins almost straight; first radial branch bifurcate, second one not divided; hind margin in apical half distinctly concave. Wings longer than elytra, with apex acute. Hind femora with two rows of numerous spinules beneath. Subgenital plate short, triangular. Ovipositor short, strongly recurved.

General coloration brownish (probably decolarated through preserving in some liquid); pronotal carinæ slightly darker; all other parts unicolorous.

Length of body	26 mm.
,, pronotum	6, 5
,, elytra	37, 5
Width of ,, in the middle	10
,, ,, in the apical fourth ..	6
Length of wings	40
,, hind femur	24
,, ovipositor	6

The only specimen of this species is from Fao, Persian Gulf (British Museum).

This is the fourth known species of the genus, the two previously known (*unicolor*, Stall, and *abnormis*, Br. W.) being Indo-Malayan in their distribution, and one has been described recently from Madagascar (*maxima*, Carl, Rev. Suisse Zool., vol. 22, No. 6, 1914, p. 167, pl. 5, fig. 5). Form of elytra in the new species is quite peculiar and the shape of fastigium of vertex, which is completely divided in two lateral parts by middle sulcus, presents another good specific character.

Gryllidæ.

60. BRACHYTRYPES CHOPARDI, sp. n.

♂. Of the size and habitus intermediate between *membranaceus*, Drury, and *megacephalus*, Lef.

Head slightly broader than pronotum. Face flattened, vertical, in shape of a regular circle (its vertical diameter being equal to horizontal one). Fastigium of vertex with a not deep impression in the form of a half-moon. Ocelli as usual for the genus size; the middle ocellus placed a little lower than the line connecting lateral ocelli; the latter placed on the outer side of vertical keels which are distinctly convergent downwards and not extending beyond the base of antennæ; middle facial space between these keels trapezoidal, distinctly higher than broad, with a wide slightly raised coarsely lineato-rugose transverse band; in the middle of which there is a small tubercle with the median ocellum on it; below this band face is rugose, except a smooth shining oval space just beneath ocellum; lower part of face, between bases of antennæ, is slightly convex: below and a little outwardly from bases of antennæ, there are short vertical keels, slightly raised and obtuse. Clypeus with a distinct transverse keel. Occiput strongly convex, raised above pronotum, very sparsely and minutely punctured. Pronotum distinctly constricted in its hind part, but less so than in *megacephalus*; its length exceeds its basal width by a little; its apical width is subequal to one and a half of the length. Disc rugose, with a short smooth median line in the fore half. Fore margin slightly concave; hind margin straight. Lateral lobes a little longer than high, scarcely broadened downwards; fore margin and fore angle broadly rounded; lower margin straight, slightly ascending backwards; hind angle about 100°, rounded; hind margin vertical. Elytra about four and half times as long as pronotum Tympanal field slightly longer than broad. Harpa with three long and 1-2 short oblique veins. Speculum oblique, elongate; its externo-anterior margin straight; fore angle nearly straight, slightly rounded. Apical field occupies less than one-third of the whole length of elytra. Lateral field with 5 branches of radial vein and 8 oblique veins, with feeble transverse venules. Wings fully developed, extending about one-fourth their length beyond the apex of elytra. Fore tibia with a large oblique tympanum on the outer side, and with but a small one inwardly; apical tibial spurs short and obtuse, the two inner ones equal to one-third part of the first tarsal joint; the outer spur about one-half of the inner. Fore tarsi about twice shorter, than tibiæ; first joint as second and third together; its apex seen from beneath oblique, obtusely produced; second joint, equal to one-third of the first; third joint twice as long as second; claws thin, almost straight, with apex bent, acute. Middle tibiæ armed with four thick and short apical spurs, the two inner and lower outer one being subequal in length to each other, while upper outer is shorter. Hind tibiæ armed inwardly and outwardly with 3-4 irregular spines of different size and shape and with six apical spurs; upper inner spur is the longest, reaching about the middle of metatarsus, and incurved; two lower spurs short and rather thin, the inner of them being a little shorter than the outer; three remaining spurs are subequal in length to each other, about one-third of metatarsus, thick, straight. Metatarsus equal to one-half of tibia, armed with three short irregular spinules outwardly and four inwardly, and with two apical spurs, the outer spur being quite short, very thick and obtuse, while the inner reaches about the middle of the third joint of tarsus, thick, slightly recurved, with obtuse apex. Supraanal plate thick, with middle part impressed. Cerci slender long, with long perpendicular hairs. Subgenital plate acutely navicular.

General coloration brownish-pale. Face pale, with the suture between it and clypeus blackish-brown; trapezoidal space upwards from the middle ocellum and its lateral margins, as well as upper margin of antennæ impressions, castaneous: vertex light castaneous, the colour gradually fading in occiput

with a pale median line bifurcate anteriorly, and two darker indefinite narrow submedian longitudinal fasciæ. Pronotum pale with fore and hind part of disc castaneous; the hind castaneous part being twice as broad as the fore one; both are connected by a longitudinal median castaneous fascia, including a pale median line; a round pale point near fore margin and another before hind margin; lateral lobes pale. All legs pale; hind knees with castaneous semilunar patches. Elytra not strongly infumate; wings hyaline, feebly infumate apically.

Length of	body	.. 34 mm.
,,	pronotum	.. 6, 5
Width of	,, anteriorly ..	.. 11, 5
,,	,, posteriorly ..	.. 9
Length of	elytra	.. 24
,,	wings	.. 32
,,	fore femur	.. 9
,,	,, tibia	.. 9
,,	,, tarsus	.. 4
,,	hind femur	.. 20
,,	,, tibia	.. 11
,,	,, tarsus	.. 8, 5
,,	,, metatarsus	.. 5, 5

Two males (type and paratype) taken at Ktubu, Arabia, by G. W. Bury in 1902.

I have the great pleasure in naming this interesting species after Dr. L. Chopard, who has done so much for increasing our knowledge of Orthoptera, and especially, of *Gryllidæ*.

The species is somewhat similar to *B. megacephalus*, Lef., but it differs from it in many important characters, as follows:—Head in *B. chopardi* is but a little broader, than pronotum; trapezoidal space between eyes higher than broad, while it is transverse in *megacephalus*. Pronotum in new species is relatively longer, less narrowed posteriorly; lateral lobes distinctly longer than high and but feebly widened downwards. Tympanal field of elytra is distinctly transverse in *megacephalus*, while it is as broad as long in *chopardi*; apical field is relatively longer. Apical spurs of fore tibiæ in *chopardi* are thick and much shorter than first joint of tarsus, while in *megacephalus* they are thinner and longer; apex of first joint of fore tarsi is in new species not truncate, as in *megacephalus*, but obtusely prominent. The larger apical spurs of hind tibiae (*i.e.*, all, except inner upper ones) are subequal to one-third of metatarsus, while in *megacephalus* they are almost as long as a half of metatarsus. From another related species, *B. membranaceus*, the new species differs partly by the same characters, as from *megacephalus*, but is most easily separated by the form of the head, which in *membranaceus* is not wider, than pronotum; pronotum in the latter species is not narrowed posteriorly; median ocellum in *chopardi* is placed on a very small tubercle, while in *membranaceus* this tubercle is very distinct; apical field of elytra in *membranaceus* is distinctly longer than one-third of elytra.

62. ACHETA CHALDEA, sp. n.

♂. Size rather small for the genus, just a little larger than that of *A. amarensis*, Chopard.

Head distinctly broader, than pronotum, though not as broad comparatively, as in *campestris* L., in profile very little prominent before eyes. Face in its lower part slightly impressed, or rather inclined, forming a very obtuse, but distinct, angle with clypeus; the latter is also subangularly prominent in its middle, if seen in profile; two scarcely perceptible impressions run obliquely from base of antennae towards the middle ocellus, not reaching the latter. Pronotum not much broader than long, equally broad throughout; fore margin slightly excavate; hind margin straight; a feeble median impressed line not

reaching the hind margin; lateral lobes gradually widened anteriorly; their hind margin forming an obliquely rotundate line with lower margin; fore angle about 90°, rounded. Elytra not reaching the apex of abdomen; tympanal area much broader, than long; four oblique veins, the first of which is but feebly developed; speculum rotundato—rhomboidal, with transverse vein curved; marginal field with 5 branches of radial vein and four oblique wings. Wings undeveloped. Hind tibiae rather inflated on the upper side, just beyond the base; both upper margins in apical half sharp; five outer spines, the first of which is about half of the second and each of the rest slightly longer than its preceding; four inner spines thick, distinctly compressed laterally, with sharply attenuate feebly sinuate tips; first inner spine as long as the last of outer spines; three others a little longer; inner upper spur not much longer than the inner apical spine, slightly longer than a half of metatarsus, rather thick and compressed, feebly sinuate; lower inner spur only a little shorter than the upper one and subequal to inner apical spine; metatarsus thick; its upper inner margin rounded, while the upper outer margin is sharp and armed with four sharp spines; inner apical spur of metatarsus thick, compressed, subequal to one-half of second tarsal joint.

Black, slightly shining, entirely non-pubescent. Head and pronotum very finely rugulose. Mandibulae reddish-brown. Eyes and ocelli buff. Elytra dark-brown dorsally and black laterally, Hind femora reddish-brown at the base.

Length of body	20 mm.
Width of head	6, 5
„ pronotum	6
Length of pronotum	45
„ elytra	11, 5
„ hind femur	9
„ „ tibia	6, 5
„ metatarsus	3
„ „ tarsus	5, 5

3 ♂ ♂ (type and two paratypes) taken at Susa, Persian Chaldea, 60mt. above sea-level, by J. deMorgan's Expedition, 1904 (Paris Museum; one of paratypes in the British Museum).

This new species belongs to small representatives of the genus and is most nearly related to *A. amarensis*, Chopard, recently described from Mesopotamia but differs from it in the shape of head, clypeus and pronotum, in the more heavy armure of hind tibiae, as well as in relative dimensions of certain spines and spurs of the latter. In its habitus, *A. chaldea* reminds more of *A. campestris* L., while *A. amarensis* is a diminutive form of the type of *bimaculata*, De Geer.

63. Gryllus tartarus obscurus Uvarov.*—Syria, Aleppo, iv-vii. 19, F. C. Aldous (British Museum).

64. Gryllus domesticus *L.*—Mohammerah, Persian Gulf, iii-iv. 17, R. C. Mabbs, 1 ♂ (British Museum).

65. Gryllus desertus Pall.—Syria, Aleppo, F.G. Aldous (British Museum).

66. Gryllotalpa gryllotalpa L.—Mesopotamia. Basrah, 27, v. 16, F. Wall (Bombay Society); River Karun, Mohammerah, Persian Gulf, iii-iv, 1917. R. C. Mabbs (British Museum).

London,
April 1921.

* Entom. Month Magaz. 1921, Vol. vii, p. 50.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, DEC. 20, 1922.]

"THE BIRDS OF MESOPOTAMIA."

BY

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ASSISTED BY

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AND

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PART IV.

(*With 1 plate.*)

(*Continued from page 674 of this Volume.*)

290. Common Gull. Larus canus.

Larus canus canus L. (Syst. Nat., 1758, p. 136—Sweden).

A fairly common winter visitor, more particularly perhaps to the river from Sheik Saad downwards. Buxton did not observe it before December and it remained common at Amara till the end of March, when it left suddenly. Neumann records it from Ras-el-Ain in February.

Six specimens examined: Sheik Saad, ♂, 14-12-16; ♀, 10-2-17 (P. Z. C. and R. E. C.); ♂, Sheik Saad, 28-1-18; ♀, 24-1-18 (Robinson); ♀, Amara, 13-1-18, 11-2-18 (P. A. B.)

291. Yellow-legged Herring Gull. Larus argentatus.

Larus argentatus cachinnans Pall. (Zoogr. Rosso-Asiat. 2, 1827, p. 318—S. E. Russia).

A common winter visitor; very numerous at Fao and not uncommon up the rivers, particularly at the sites of larger towns where food supply in the shape of offal abounds, up to and beyond Baghdad. It is recorded in every month of the year, so some non-breeders must spend the summer; it is recorded from Basra on May 28th and in August, while by September 7th it is common at Baghdad, whence it is also recorded in mid-July and June; Meinerzhagen records it scouring even the desert for food.

There is no evidence of the European Herring Gull occurring in Mesopotamia.

One skin examied: Amara, 27-11-17 (P. A. B.).

292. Lesser Black-backed Gull. Larus fuscus.

1. *Larus fuscus fuscus*, L. (Syst. Nat., 1758, p. 136—Sweden).
2. *Larus fuscus taimyrensis* (=*affinis* auct.) But. (Mess. Orn. 1911, p. 149—Yenissei).

(1) While anchored at Fao bar on November 23rd, 1917, and again on March 16th, 1918, I saw several adults of this species. Round the ship were many *taimyrensis* and *cachinnans* quarrelling for scraps, and amongst them the almost

black mantle of these birds at once drew attention, while as they dipped for food their bright lemon-coloured legs were easily seen.

There are no other records of this species, which is probably a winter visitor to Fao district in small numbers ; Fao must be about its limit east.

(2) The Siberian Lesser Black-backed Gull is common, especially at Fao and what has been said about the Herring Gull applies apparently equally well to this bird, except that there is no record of it north of Baghdad.

293. Great Black-headed Gull. Larus ichthyaetus.

Larus ichthyaëtus, Pall. (Reise, Russ. Reichs. 2, 1773, p. 713—Caspian Sea).

Magrath saw huge gulls with black heads on the Suweikiyeh Marsh in August which could only have been of this species.

There is no other record, but it is a bird which of course is quite likely to occur. The Sooty Gull (*L. hemprichi*) which certainly occurs in the Gulf is as yet unrecorded at Fao ; though on the look out for it, I failed to see it west of Bunder Abbas in November and March.

294. Black-headed Gull. Larus ridibundus.

Larus ridibundus, L. (Syst. Nat. Ed. 12. 1766, p. 225—England).

A winter visitor, very common from Fao on both rivers to Hit and Tekrit respectively. It arrives back quite early, some being noted by mid-July near Baghdad, and some may still be seen at the end of May. Possibly a few non-breeders may spend the summer as in the case of the Herring Gull, though there are no actual records in June or July. Pitman says it was quite absent from the marshes of the Hindia Barrage, etc., in these months and there is no evidence that it breeds in our area. It assumes its breeding plumage before leaving in the spring. They become very tame and used to the various river craft which ply in the port of Basra, and Pitman relates that he saw a *bellum wallah* actually catch one in his hand as it flew over his *bellum* in Aschar creek. There is no record of *melanocephalus* in our area.

♂ ♀, Sheik Saad, 14-3-17 ; ♂, 20-3-17 (two) (P. Z. C. and R. E. C.), ♂ Sheik Saad, 15-1-18 (Robinson). Amara, 13-1-18 (P. A. B.) ; Basra, 20-11-7 (C. B. T.).

295. Little Gull. Larus minutus.

Larus minutus. Pall. (Reise Russ Reichs. 3, 1776, p. 702—Siberia).

Zarudny records this as a passage migrant in the Karun district.

There are no other records ; it is not unlikely to occur in small numbers.

296. Slender-billed Gull. Larus gelastes.

Larus gelastes, Licht. (Theinem,. Fortpf. Vog. Eur., pt., 5, p. 22 1838—S. France).

The Slender-billed Gull is common and resident; in winter it is widely distributed and may be met with frequenting the rivers in flocks from Feluja and Samarra southwards, as well as flooded areas. In summer they congregate in their breeding grounds, which are the marshes and lakes in the Hindia Barrage area and elsewhere.

Here near Museyib, Pitman found them in thousands in June and July ; on June 12th he found a colony of grass-built nests on islands in the marshes which though no eggs were found, he certainly took to belong to this species. Buxton records that it probably breeds in the marshes 20 miles east of Amara, where he obtained a bird on July 10th. It certainly breeds near Fao, where Armstrong found an egg in June which had been flooded out of its nest by the tides sometime previously. The egg was on a small mound in that part of the mud-banks

which are liable to be flooded by spring tides, and which lie between Fao and the Abdulla Banks ; from the latter neighbourhood Cumming obtained eggs on April 24th, 1884. Tomlinson found an egg of this Gull in the marshes near Basra about June 9th, 1913.

Just before and just after the breeding season this species may be met with in huge flocks on floods, such as existed at Akkarkuf near Baghdad.

Three skins examined : Akkarkuf 6-10-17 : ♂, Halfayah, 6-7-18 (P. A. B.), Hindia Barrage, 8-7-17 (C. R. P.).

297. Whiskered Tern. Hydrochelidon leucopareia.

Hydrochelidon leucopareia (Temm.) (Man. d'Ornith. 2nd Ed. 2, 1820, p. 746—Hungary).

Cumming has recorded that the Whiskered Tern is resident all the year at Fao though all the specimens he obtained were got in August and September. Pitman says it first arrived near Feluja on April 23rd ; he saw many on the inundations west of Baghdad at the end of May. In June he found it breeding in the marshes of Babylon, Kerbela and Museyib, on both banks of the Euphrates, and took two nests of one and two fresh eggs respectively on June 3rd, and obtained a breeding bird. The nests were quite large made of grasses and aquatic plants and were almost in the water on a semi-submerged strip of land in the centre of a large marsh ; he found also many empty nests. The eggs were pale stone and pale clay buff, sparsely spotted and blotched with brownish surface, and purple-grey and slate shell markings. They average 1·585×1·215 inch or 40×31 mm.

It is noted as common near Baghdad from mid-July onwards, also on Suweikyeh Marsh and Cheesman obtained one at Sheik Saad on December 15th.

298. White-winged Black Tern. Hydrochelidon leucoptera.

Hydrochelidon leucoptera (Temm.) (Man. d'Ornith., 1815, p. 483—Mediterranean shores).

A common summer visitor to the marshes of lower Mesopotamia ; it arrives about the middle of April till well on into May and may then be found feeding in flocks over cornfields, stubbles, etc., as well as marshes and on the rivers. So far as I am aware no eggs were actually taken but there can be no doubt that it breeds. Magrath says it nested on the shores of the Suweikiyeh lake ; Tomlinson saw pairs near Basra in the breeding season, and Buxton found it common near there on May 28th and saw some on the Hamar lake on the 15th. On the marshes round the Hindia Barrage, Pitman found it fairly common in June and July and obtained a bird on June 12th, he thought that probably some of the empty nests he found there belonged to this species and that on June 3rd most of these and Whiskered Terns had hatched out. He saw plenty of young on the wing there on July 2nd. After the breeding season they spread out to other marshes and floods, and Pitman noted that in August flocks were coming to the marshes near Baghdad to hawk insects at dawn and in the evening, while they were absent during the rest of the day. Buxton noted flocks passing up the river, probably on passage, every day at Baghdad from September 7th to 24th and this letter date is the last on which there is any record. This species was recorded in many places from Tekrit to the Karun river, but the only places where there was at all any evidence of its breeding are those mentioned.

Zarudny curiously omits this Tern from his list, but says the Black Tern (*H. nigra*) is a passage migrant. We have no records of this species.

299. Common Tern. Sterna hirundo.

Sterna hirundo, L. (=*fluviatilis*, auct.) (Syst. Nat. Ed. x, 1758, p. 137—Sweden).

The Common Tern seems to be resident in Mesopotamia moving about locally but as there few winter records perhaps the majority are summer visitors

Zarudny says it occurs in winter in the Karun river and Pitman records it all the year on the rivers and marshes but nowhere common except at the nesting places. By March 20th I found it common on the lower reaches of the Shat-el-Arab, otherwise all the other records relate to the breeding season.

Tomlinson says it breeds near Basra early in June on sandy islets in the inundation ; Cheesman found it breeding at Gurmat Ali and the Hamar lake, and Buxton on the drying marshes east of Amara. It probably breeds at Ahwaz. Pitman found large colonies nesting in June in the marshes of the Hindia Barrage; no nest was made, the eggs being laid in a scrape or natural depression ; over 100 fresh eggs were examined on June 2nd and 3rd and many eggs were destroyed through the rising of the water ; 49 eggs varied from 1·33-1·6×1·04—1·2 inches (or 33·75—40·5×26·5—30·5 mm.) ; the ground colour varied through all shades of green to almost deep blue. This Tern probably nests in many other places, such as the Tekrit area where Logan Home saw it in June.

Skins obtained : ♂, Basra, 19-4-17 (P. Z. C. and R. E. C.) ; Hindia Barrage, 2-6-17, 25-6-17 (C. R. P.).

Several observers thought they saw the Arctic Tern in Mesopotamia, but so far we have no evidence that it occurs.

300. Little Tern. Sterna minuta.

Sterna minuta minuta, L. (Syst. Nat. Ed. xii, 1766, p. 228—S. Europe)

The actual status of the Little Tern is doubtful, probably most are summer visitors, though perhaps here and there a few spend the winter. Thus Pitman says that at Kut some were seen after heavy rain in winter and I saw two over the river at Basra on November 23rd.

On April 18th Cheesman noted parties flying up the river at Basra all day, evidently a movement up to some breeding ground ; Pitman records the arrival at Feluja on April 29th.

It breeds in many places from Tekrit to Fao ; the site usually chosen is the bare dry ground on the edge of a flooded area, or islands in marshes, and consequently, as with the Common Tern, many nests are destroyed when the floods rise. Two eggs form the usual clutch, but sometimes three are laid ; 13 eggs average 1·15—1·29×·9—·97 inch (or 26·5—32·75×22·75—24·5 mm.) according to Pitman who says the ground colour in some cases was greenish stone. It breeds on sandy islands on the Karun at Ahwaz. The majority have left by the end of September, and Buxton records an apparent migration up the Tigris at Baghdad from the 7th to 26th.

Four skins examined : ♂, Fao, 12-5-18 (Armstrong) ; Kurna, 8-6-19 ; Basra, 16-8-19 (Logan Home). ; Basra, 18-4-17 (P. Z. C. and R. E. C.).

Besides these there are a good many from Fao in the B. M. ; all belong to *minuta*, the typical race, and not one of them is *saundersi* (the type and a large series of topo-types of which I have examined). *Saundersi* has been recorded from Fao by Sharpe and is said to breed near the Abdulla Banks. Armstrong's bird which was breeding on the dry mud above high water mark at Fao however, and all Cumming's birds in the B. M. are *m. minuta*.

Zarudny records *saundersi* as rare in winter in the Karun district, but at present I consider that it should be deleted from the Mesopotamian list.

301. Large Crested Tern. Sterna bergii.

Sterna bergii velox, Cretzsch (Rupp. Atlas, p. 21, 1826).

Cumming states (Ibis. 1891) that he obtained six eggs at Fao ; probably it breeds on one of the islands in the head of the Gulf and must occur off the Fao littoral and the entrance to the Shat-el-Arab where Harrison says he saw it ; it is not likely to penetrate inland. According to Hartert it is the above race which occurs in the Persian Gulf,—I have seen no specimens thence.

302. Lesser Crested Tern. Sterna media.

Sterna media bengalensis, Less. (Traitè, p. 621, 1831).

The only record of the Lesser Crested or Allied Tern I can find is that of one shot at Fao in June 1900 by Mr. Ffinch ; it is in the British Museum. It must occur commonly off Fao one would think ; it breeds on an islet near the island of Arabè in great numbers (*Hume's Nests and Eggs* 4, p. 299). Pitman thought he saw it on the floods near Baghdad but so essentially a sea tern is not in the least likely to occur inland. The White-cheeked Tern (*Sterna albigena* auct) may occur off Fao ; it breeds on Allah island 40 miles east of Bushire (Hume *l. c.*, p. 312) in June.

303. Lesser Sooty Tern. Sterna anæthetus.

Sterna anœthetus (Del. Faun. et Flor. Ins. 2, 1786, p. 92—Phillipine Islands).

This Tern breeds on Allah off Tungistan, east of Bushire in June and July (Hume *t. c.*, pp. 300, 312). Its only claim to inclusion is Zarudny's statement that he saw two skins which had been obtained at the mouth of the Karun river at Mohommera.

304. Caspian Tern. ♭ Sterna caspia.

Sterna caspia, Pall. (Nov. Comm. Petrop. pt. 14, 1, 1770, p. 582—Caspian Sea).

This fine Tern is resident in Lower Mesopotamia, and breeds on Warba island of the Khor Abdulla whence Huskisson obtained eggs and a parent bird for Butler on April 3rd, 1878 (*Hume's Nests and Eggs* 4, p. 296). In the non-breeding season it is not very uncommon on the rivers up to at any rate as far as Samarra and doubtless visits the lakes as well ; even in the breeding season odd non-breeding birds may be met with. It is commoner on the Shat-el-Arab than elsewhere.

305. Gull-billed Tern. Sterna anglica.

Sterna anglica, Montagu (Orn. Dict. Suppl., 1813—England).

The Gull-billed Tern is also resident and is fairly common. I saw them at intervals all the way up the river to Basra on November 20th and again on March 16th. Cumming records that it is resident and breeds on both sides of the river at Fao. It also breeds on Warba island abundantly in a tightly packed colony, but on a different part of the island to the Caspian Terns ; eggs were obtained by Huskisson on April 3rd, 1878 (*Hume's Nests and Eggs*). Pitman thinks that some were breeding on dry islands in the flooded area of the Euphrates marshes near Museyib, but eggs he obtained in the first week of June are all far smaller than any known eggs of this species and measure about 43·7×31·75 mm. ; as he did not see the birds on the nests it is very doubtful whether these eggs belong to this species though it is quite possible they were breeding there as he saw and obtained specimens.

Two skins examined :—L. Akkarkuf, 12-8-17 (C. R. P.), Basra, 21-11-17 (C. B. T.).

306. Great Crested Grebe. Podiceps cristatus.

Podiceps cristatus cristatus, L. (Syst. Nat. 1758, p. 135—Sweden).

So far as is known the Great-crested Grebe is a winter visitant in small numbers to the rivers and inundations. Pitman obtained two adults in breeding dress on L. Akkarkuf on August 21st, so that it is within the bounds of possibility some may breed in our area ; all other records relate to the winter months.

Five skins examined :—♂, Amara, 17-12-18 (P. A. B.); ♂, Amara, 7-1 18 (P. Z. C. and R. E. C.), 2 L. Akkarkuf, 21-8-17 (C. R. P.); Amara. 12-2-17 (Bagnall).

These seem in no way different to west European examples.

307. Black-necked Grebe. Podiceps nigricollis.

Podiceps nigricollis nigricollis, C. L. Brehm. (Vög. Deutschl., 1831, p. 963—E. Germany).

Apparently resident in small numbers ; Pitman records that he found this species breeding in the marshes west of Museyib near the Barrage in May and June and that it was still present in July.

He found two nests on June 2nd each containing a single egg ; these measure 1·83×1·21 and 1·71×1·23 inches. On L. Akkarkuf he often saw 6 or 8 adults together in August and obtained specimens.

In winter this species spreads out and may be found in the rivers ; Neuman records it from Ras-el-Ain.

Five skins examined : Amara, 25-12-17 (P. A. B.) ; Kut, 18-3-18 (Hobkirk); Sheik Saad, 13-12-16 (P. Z. C. and R. E. C.); ♂ ♀, Sheik Saad, 22-12-17 (Robinson).

308. Little Grebe. Podiceps fluviatilis.

Podiceps fluviatilis capensis, Salvad. (Ann. Mus. Civ. Genova., (2) 1, p. 252, 1884—Shoa).

The Little Grebe is fairly common and resident. Pitman found it breeding commonly in the marshes west of Museyib in June and during the first fortnight of that month found many nests, quite a number being in quite a small area. The nests contained 4 to 6 and even 7 eggs in various stages of incubation. These measured 1·305—1·51 × ·915—1·09 inches (or 33—38·5×23—27·5 mm.) they varied much in size and shape.

Tomlinson recorded it breeding at Basra and found six nests in a small area on June 9th. In winter it spreads out and may be found on the rivers and inundations where it is not to be found in the breeding season.

Three skins examined : ♀, Amara, 15-2-18 (P. A. B.); L. Akkarkuf, 19-7-17 (two) (C. R. P.).

These are clearly *capensis* and not the European bird ; in the latter the white of the flight feathers is always confined to the inner webs of the secondaries ; in *capensis* the amount of white is more extensive on the secondaries and extends to the outer web also ; moreover the white extends to all except the first three or four primaries, always on the inner, often on to both webs.

309. Water Rail. Rallus aquaticus.

Rallus aquaticus korejewi, Zar. (Orn. Monats., 1905, p. 209—N. E. Turkestan).

The Water Rail is a winter visitor, probably fairly common, but, like all Rails, being unobtrusive few came under observation. It appears to be generally distributed in suitable localities and the records range from September 10th to February 9th.

One was caught in a " dug out " at Samarra.

Four skins examined :—♀, Basra, 9-2-19 (Armstrong); Samarra, 24-12-17 (C. R. P.); Sheik Saad, 10-9-17 (P. Z. C. and R. E. C.); one Amara (P. A. B.). These I refer to the eastern race with the paler markings on the upper parts.

310. Spotted Crake. Porzana porzana.

Porzana porzana, L. (Syst. Nat. Ed. xii, 1766, p. 262—France).

This Crake is not very uncommon on both migrations and most come under observation by being caught exhausted or being found dead under the telegraph wires. We have no evidence that it breeds or winters on Mesopotamia ; there are several records between March 18th and May 20th in the spring and August 27th and October on the autumn passage.

Photo. Capt. C. R. Pitman.

A.—Nest and eggs of Little Grebe. 12-6-17.
Near Euphrates Barrage. (Eggs uncovered for photo.)

Photo. Capt. C. R. Pitman.

B.—Marshes near Kurna, R. Tigris.

Amongst other breeding birds in these parts are:—Pygmy Cormorants, Darters, Little Grebes, Reed Warblers, Gallinules.

Six specimens obtained : ♂, Shaiba, 29-9-16 ; ♀, Sheik Saad, 7-4-17 (P. Z. C. and R. E. C.); L. Akkarkuf, 27-8-17 (C. R. P.); Amara, 20-3-19 (L. Home); 2, Amara (P. A. B.).

311. Little Crake. Porzana parva.

Porzana parva, Scop. (Ann. 1 Hist. Nat., 1769, p. 108—Carniola).

Apparently a winter visitor and not very uncommon.

Cheesman obtained one at Sheik Saad on September 13th out of a melon bed. Pitman thought it was fairly common in the marshes of Kurna on March 24th. Tomlinson records it from Basra in February and on May 16th. Zarundy gives it as a winter visitor.

Four skins examined : ♂, Basra, 8-3-17 (Stevens) ; ♀, Sheik Saad, 13-9-17, (P.Z.C. and R.E.C.); ♂, Feluja, 23-4-17 (C. R. P.) ; Samarra, 11-3-18 (Hobkirk).

312. Baillon's Crake. Porzana pusilla.

Porzana pusilla intermedia (Herm). (Obs. Zool. 1, p. 198, 1804—Strasbourg).

Cumming obtained one at Fao in October and records it as a winter visitor. Pitman says he saw several in the marshes at Kurna whilst shooting in January; Cumming's bird belongs to the above race.

313. Corncrake. Crex crex.

Crex crex (L.) (Syst. Nat., 1758, p. 153—Sweden).

The Corncrake is a passage migrant in spring and autumn, it arrives during the last half of April and may be met with till the third week in May ; the return passage begins about the middle of September and lasts well into October. At these times it is not uncommon. Cumming has recorded that stray ones may be seen in June and July and all have gone by the beginning of December ; we have no evidence of it remaining to breed nor have we any winter records. It is interesting to note that this bird was found at the Oasis of Shaiba on the autumn passage and one must suppose that it intended to continue its flight across Arabia ; in slight confirmation of this I may mention that I obtained some years ago the wings of corncrakes from two Red Sea light-houses on spring and autumn migrations, together with those of a Scops Owl, Persian Bee-eaters, Rollers, Quails, Spotted Crakes, etc. (Sanganeb Lt. off P. Sudan and Daedalus Lt.).

Four specimens examined : ♀, Shaiba, 17-9-16, 4-10-16 (P. Z. C. and R. E. C.); Feluja, 20-4-17 (two) (C. R. P.).

314. Water Hen. Gallinula chloropus.

Gallinula chloropus parvifrons. Blyth. (J. A. S. B. 1843, p. 180—Calcutta).

Common everywhere in the marshes in winter and also breeds in suitable places. Probably a certain number are winter visitors and passage migrants. Chesman records that one was shot from the top of a 30-foot Tamarisk at the Oasis of Shaiba on September 30th which, had it resumed its migrations, must have taken it into Arabia. Logan Home found two nests at Basra on May 22nd and Tomlinson records finding eggs there from June 9th to 21st. Cheesman noted that a pair took up their quarters and apparently intended to breed in a small reed covered pool which after being dry and bare for six months had become filled by the river floods in April.

Hobkirk found a nest of eggs on June 6th at Girdilaun.

Four skins examined : ♀, Basra, 6-2-19, w. 152·5 (Armstrong); ♂, Kazimain, 6-5-19 (breeding), w. 166; ♂, Shaiba, 30-9-16, w. 170 (P. Z. C. and R. E. C.); ♀, Amara, 6-4-18, w. 153 (P. A. B.).

From the smallness of these birds they must belong to the eastern race *parvifrons* with which they well agree. Grant (Ibis. 1915, p. 47) in a review of races of the Water-hen gives as the measurements of this race : ♂, 155-175 ; ♀, 159-162. Our birds come well within these measurements, in fact the two females are smaller than his minimum.

It is interesting to find this race so far west and it is in keeping with what we know about the occurrence of not a few other eastern races in our area.

315. Coot. Fulica atra. "Dijaj Mai."

Fulica atra, L. (Syst. Nat., 1758, p. 152—Sweden).

In its general distribution the Coot is very common in winter in all the marshes and inundations while parties may be met with on the rivers right down to Fao. Probably many are winter visitors but in some places, at all events it breeds. Thus Pitman found many breeding in the marshes west of Museyib near the Barrage in June and on the 9th found a clutch of five incubated eggs ; in July, August and September he saw many adults and young ones. Buxton met with several on the Hamar Lake on May 19th so it is quite likely that it breeds there also. Livesay also obtained eggs, probably in the Euphrates marshes.

Magrath records that the Coots were very tame and familiar and used to swim round when " Tommy " was bathing and pick at the soap suds. The bridge of boats at Samarra was a constant source of annoyance to the flock of coots which used to live all day above it ; the current drifted them down to the bridge whence they used to flap up stream again to their chosen spot only to be drifted down again and so on *ad infinitum*.

316. Purple Gallinule. Porphyrio poliocephalus. "Birhan."

Porphyrio poliocephalus poliocephalus, Lath. (Ind. Orn. Suppl. p. lxviii, 1801—India).

Common and resident in all suitable large marshes, where reeds are plentiful; Cheesman records that it was apparently going to breed in the Horr Sanef. Buxton found it breeding in the Hamar Lake on May 19th—21st where he found their nests containing three to four eggs, fresh to much incubated. Pitman saw plenty in the marshes west of Museyib and found a nest of four eggs on June 9th nearly hatching. Marshall and Tomlinson found nests at Kurna, three eggs on May 15th and four eggs on May 3rd. Logan Home found it breeding plentifully at Abu Aran in June. The nest built in reed beds, where the water is two to four feet deep, resembles a coot's nest and is made of dead reeds with a few stalks bent over above to make a slight screen. The Arabs collect the eggs for eating.

Ten specimens examined : ♂ ♀, Horr Sanef, 20-3-18 (P. Z. C. and R. E. C.) ; ♂, Amara, 12-5-18 ; 3 ♂, 2 ♀, Hamar Lake, 20-5-18 ; ♂, Amara, 5-1-18 (P. A. B.). Besides these I have examined three others on the British Museum from Mesopotamia.

The typical race comes from the peninsular of India ; there has been described a race—*seistanicus*—from Seistan by Zarudny and Härms (J.F.O., 1911, p. 240), differing from the Caspian bird by the paler coloration, and the Caspian bird has been described by Hartert as *caspius* (Novit. 24, p. 266) on account of its larger size as compared with the typical race. The question therefore arises as to what race the Mesopotamian birds belong. Hartert gives as wing measurements of *caspius* ♂, 270—286, ♀ 259—266 mm. Our birds measure ♂, 257—272, ♀ 239-255 mm., and three unsexed examples 224, 250, 253, so evidently our birds are not *caspius*, in fact they agree well in measurement with and are not at all paler than Indian peninsular examples.—Indian birds (both sexes) measure 237-271 mm. Nor can I find any difference by which our birds may be differentiated from Indian birds either in size of bill or tarsi or feet, all of which vary very much.

Zarudny in his list of birds of the Karun district places *P. œruleus* ? as a common resident. The only information Zarudny had concerning Gallinules he obtained from the Arabs who described to him the birds and nests, and he supposed that it would be this species which occurred in the Hawaizie marshes. Jourdain informs me (*in litt.*) that he has 12 eggs of *seistanicus* from Mesopotamia ; I know not how he arrived at the determination of these eggs, the average measurements of which he gives as 50×37·5 mm. (almost exactly the same as Blanford gives for the Indian bird) ; if he was going on the eggs themselves it would only show that the eggs of these two races cannot be differentiated, as I am not aware that *seistanicus* occurs in Mesopotamia at all.

As Hartert described *caspius* from five birds from Lenkoran and two from E. Persia, it would seem highly probable that *caspius* is the same as *seistanicus*. *P. cæruleus* does not occur at all ; specimens, which were referred to this, in the British Museum from Mesopotamia are in fact *poliocephalus*.

317. Stock Dove. Columba ænas.

Columba œnas, L. (Syst. Nat. Ed. x, p. 162, 1758—Sweden).

Woosnam found the Stock Dove plentiful on the Diz and Kerkha rivers in the Karun district, where Zarudny also records it as a winter visitor and passage migrant. Pitman thought he saw it at Sheik Saad in January and at Kut in November. There is a specimen from Baghdad in the British Museum obtained by Loftus. Cheesman met with it. Brooking has recorded that it was heard occasionally at Nasariyeh and Ramadi. Zarudny has described a race-*hyrcana* from the S. Caspian region ; two specimens I have examined from near Shiraz in winter differ in no way from English ones.

318. Wood Pigeon. Columba palumbus.

Columba palumbus palumbus, L. (Syst. Nat. Ed. x, p. 163, 1758—Sweden).

The Wood Pigeon is extraordinarily local in Mesopotamia. Round Basra it is not uncommon and as there are records of it there in small numbers from March to August, it must certainly breed there. Cumming records that, in one year only, many visited Fao and built in the date palms there, but left again as suddenly as they arrived. At Baghdad it appears to be resident and fairly common and it must breed there also, though no nests were reported ; Cheesman however was assured by the natives that they do nest there in the gardens. It occurs and is probably resident in the foothill towns of the Karun district as Diz, where Woosnam records it, and Shush, where Cheesman saw and heard them on May 3rd. Buxton, who was at Amara for some time, never met with it there nor at any other place during his wanderings except at Baghdad ; Pitman at Feluja, Museyib, and Samarra failed to see it and Logan Home only came across it at Basra. Brooking in his list of birds observed by him says the "Ring Dove" is common and breeds in the palm groves of the Euphrates, but he almost certainly refers to a Dove and not the Wood Pigeon. Hingston records it from Khanjedidah in April. Livesay obtained eggs but failed to supply any further details.

It would certainly seem that this Pigeon is a bird of palm groves, but yet does not occur everywhere the palm does. Its status requires further examination. Cheesman says the cooing and love flights are exactly similar to those of the English bird, but he noticed a constant difference in the bill which he says is "putty white," nostril pinkish, instead of the usual coloration ; he verified this in about a dozen birds shot in winter. This difference is lost in dried skins, as those which I have seen from Mesopotamia differ in no way from the English birds nor could I detect any other difference by which they could be separated ; to separate the Mesopotamian Wood Pigeon as a distinct race, therefore, only on coloration of bill in life would, I hardly think, serve any useful purpose.

Six specimens examined: ♀, Baghdad, 21-9-17 (P. A. B.); ♀, Baghdad, 14-1-19, 22-1-19 (two); ♂, 11-2-19, 9-2-19 (P. Z. C. and R. E. C.).

The eastern form *casiotis* does not, so far as I am aware, occur.

319. Rock Dove. Columba livia.

Columba livia gaddi, Zar. and Loud. (Orn. Monats. 1906, p. 133—Karun R.).

Common and resident wherever suitable places exist; it swarms in most of the larger towns, as at Mosul and Baghdad, and is semi-domesticated, all being however pure blue, none of the mongrel kinds seen in most places having as yet been introduced. In the towns it frequents houses and particularly mosques and so enjoys a considerable amount of protection. Elsewhere it inhabits ruins, and the arch at Ctesiphon swarms with them; all along the cliffs in the Tekrit and Samarra districts it is abundant, and it nests in the Euphrates Barrage at Hindiyeh and in wells at many places. It is common enough in the towns of the Karun district and occurs in the Jebel Hamrin, as at Mendali, in cliffs many miles from any habitation. Where no suitable sites exist for it as at Kut, Ali Gharbi, Sheik Saad and Fao it is rare or absent. There is nothing very particular to note about its nesting habits; as elsewhere more than one brood is reared and Pitman records fresh eggs and fledged young in June. At the Barrage no nest is made, the eggs being deposited on the bare shelves.

Five skins examined: ♂, Mendali, 2-8-18 (P. A. B); Adhaim, 15-11-17; Samarra, 7-3-18 (C.R.P.); ♂, Amara, 9-2-18 (P.Z.C. and R. E. C.); ♂, Shustar, 18-1-18 (F. M. B.).

In addition to these five I have examined two others from "Mesopotamia;" one from Biridjik; one from Kharag Is. off Bushire; three from Palestine; one from Muscat and a very large series from Afghanistan, Beluchistan, N. W. India and Turkestan. As regards the Palestine, Mesopotamian and S. W. Persian birds these are not the typical race, the upper parts are distinctly paler and the birds are smaller. Rock pigeons vary very considerably throughout their range and doubtless introduced stock in some places upsets all attempts at classification into races; but if one is going to recognize races of this pigeon at all, one must consider what race the Mesopotamian bird belongs to; it is certainly not *livia* as already pointed out, and it is equally certainly not *intermedia*. Several observers thought they saw *intermedia* in Mesopotamia because they saw Rock pigeons with bluish rumps. From the very large series I have seen from the above mentioned localities there was not a single example of *intermedia* (which is a fairly distinct race from Central and South India), and as for the colour of the rump in our Mesopotamian birds, it goes for nothing; some are pure white, others pale blue grey, and some are white tinged with this colour, but none has the slate grey of *intermedia*; it is purely an individual variation. Zarudny and Loudon described *gaddi* from the Karun river, their description tallies well with our Mesopotamian birds and the latter are all quite similar to a topo-type of *gaddi* from Shustar; quite the same also are the three birds from Palestine and the birds from Biridjik and Kharag Island—all are rather pale and rather small (wings 215—227 mm.) and therefore I consider *palestinæ* of Zedlitz (J. F. O. 1912, p. 339) to be a synonym of *gaddi*. The Muscat bird is paler than any others I have seen and more from this locality are desirable.

320. Turtle Dove. Streptopelia turtur. "Tabaan"

1. *Streptopelia turtur arenicolor* (Hart.) (Novit. Zool. 1894, p. 42—Fao).
2. *Streptopelia turtur turtur* (L.) (Syst. Nat. Ed. x. p. 164, 1758—England).

The eastern race of the Turtle Dove is an exceedingly common summer visitor to the whole of our area and also a passage migrant through the country. The

first few arrive in the last days of March and they become numerous throughout April ; many leave during September and few are to be seen up to October 25th. Cheesman and Buxton found it rare at Baghdad and thought that it only occurred there on passage, its place being taken there, as a breeding bird by the Indian Ring Dove (*S. decaocto*); otherwise it breeds freely in all areas from Tekrit to Fao and Karun district.

Nests ready for eggs may be found in the last days of April ; eggs are reported during the first week of May and are general by the middle of the month and may be found well on into June ; its nesting habits do not appear to differ from those of the European bird.

Large flocks probably of passage migrants were noted in the Samarra district in April and in the willow jungles at Shush on May 3rd, while Magrath saw flocks migrating over the Sanniyat position regardless of a heavy artillery bombardment.

Eleven specimens examined : ♂, Amara, 6-6-18, 24-4-18. ♀, 26-10-18; ♂, Baghdad, 29-7-18 (P. A. B.); Sheik Saad, 2-4-17; Zobeir, 11-5-16; ♀, Basra, 2-8-16; Baghdad, 11-4-19 (P. Z. C. and R. E. C.); Wadi, 26-4-17 (?)

All these are *arenicolor* with paler wing coverts and scapulars, and usually paler mantle and head, than the European birds. One specimen shows the "rufous phase" which is also to be found in the typical race.

(2) The typical race according to Weigold passes through Urfa on spring migration from April 16th onwards. Sassi records it from Mosul, Zarudny gives it as a passage migrant in the Karun district. Witherby identified one from Feridan in W. Persia obtained by Woosnam on May 10th as belonging to this race.

Pitman obtained two at Feluja on passage on April 11th which from their darker colour I assign to the typical race. They match British specimens well.

321. Indian Ring-Dove. Streptopelia decaocto (= risorius *auct.*) "Fuchtee."

Streptopelia decaocto decaocto (Friv.) (A. M. Tàrsàsag Evkönyvei, 1834-36, iii, p. 183, 1838—Turkey).

Where this dove occurs it is quite common and its breeding distribution is evidently much influenced by the presence or absence of date palm groves. From Fao to Kurna it is resident and breeds, as also up the Euphrates where palm groves exist and also at Baghdad where it is common.

In some places, such as Amara, Kut, Qalet Saleh it is a winter visitor and not at all common even then, a flock perhaps frequenting the same spot where food is plentiful, such as mule lines, etc., all the winter ; while in other places, as Feluja and the Samarra-Tekrit area where the locality is not suited to it, it would appear to be absent altogether.

It nests usually in palm trees, sometimes as high up as 30 feet, and the nesting season is a long one, eggs being reported early in May up to September.

Four specimens examined : ♂, Basra, 28-7-16; ♀, Kazimain, 30-3-19 (P. Z. C. and R. E. C.); ♀, Baghdad, 11-9-17, , 23-1-18 (P. A. B.)

322. Little Brown Dove. Streptopelia senegalensis.

Streptopelia senegalensis cambayensis (Gm.). (Syst. Nat. I. 2, p. 779, 1789—Cambay, Bombay Pres.)

The status of this dove is quite unknown in Mesopotamia. Cumming obtained one at Fao in January in a severe storm and Buxton got one female at Amara on February 1st, 1918. I have examined both these skins, whose wings measure 127·5 and 130 mm. and they are in no way separable from birds from the Bombay Presidency, and this species must be added to the list of those Indo-Beluchi birds which straggle along the Persian Gulf into Mesopotamia. Hartert (Vog. P. F. pl. 495),

refers this Fao specimen to a larger race *ermanni* (from Bokhara) but both these Mesopotamian specimens are well on the small size for this and are not larger than many Bombay birds. Weigold records *cambayensis* from Aleppo and Biredjik as common and resident. I have seen no specimens thence but Hartert (t. c.) gives Palestine as being inhabited by the typical race and almost certainly these Syrian birds belong also to this race and not to *cambayensis;* moreover the wing length given by Weigold (149-150 mm.) is much too large for this latter race.

323. Spotted Sand-grouse. Pterocles senegallus.

Pterocles senegallus (L.) (Mant. Plant. Regni. An App., p., 526 1771 —"Senegallia").

The Spotted Sand-Grouse is common, and widely, but rather locally, distributed and is resident. It is not in most places so numerically abundant as *alchata,* and like the latter it is subject to local migrations in the country, due to exigencies of food, water and breeding ground. In most places the Large Pintail is the commoner bird and with them may be found a few Spotted, or the latter are in small flocks by themselves ; at Nasariyeh however the reverse is the case and in this district the latter bird is abundant, the former scarce, as well shewn by a bag made there on August 25th, when 7 guns obtained 140 *senegallus* and only 10 *alchata.* So too in the triangle Baghdad-Feluja-Museyib *senegallus* would seem to be the commoner bird, while in the Kurna-Amara district it is rare. Until we know more about the food supply of these two birds their curiously patchy distribution will remain obscure.

A good many breeding localities are recorded; it evidently breeds in some numbers along the edge of the Arabio-Syrian desert from Shaiba westwards ; it breeds also in numbers between Museyib and Baghdad (there being a very large colony about halfway) and between Baghdad and Feluja; it breeds in the Samarra and Tekrit districts and in places, though no large colonies are reported, from there to Basra. So little has been recorded concerning the breeding of this bird that I will quote the notes sent by Logan Home *in extenso:*—"On June 18th I set out from Chunabdah (about 40 miles W. of Basra) at 4-30 a.m.; the sun rose at 5 a.m., I saw large numbers of *Cursorius, P. alchata* and a fair number of *senegallus.* These all fed up to 7 a.m., when they commenced flying to water at the marsh edge six miles distant to the East. About 7-15 a.m. I saw a *senegallus* creeping through some small plants about 300 yards off, evidently having run off eggs. I sat down and watched it and in twenty minutes it had come back a bit and squatted. I gave it ten more minutes to make sure it was on its nest and then walked to the spot and found nil ! The bird ran off as soon as I stood up, although fully 300 yards away. I then moved to another position 500 yards away on the other side of the spot. About 8-40 a.m., another *senegallus,* a female, flew in towards where I was lying, and settling within a 100 yards ran to a spot and squatted down. I watched it for 10 minutes ; then another, the male,came along from the direction of the marsh to the same spot and, when within 10 yards of the squatting bird, the latter rose and flew off to the water and the former ran on to the same spot and remained there. I then knew there must be eggs and walking to the spot I found a nest containing three eggs. The nest was merely a slight scrape in the hard soil on top of a stony plateau about 20 feet above the surrounding plain. Further on I saw another *senegallus* female 400 yards away feeding; after 10 minutes watching she crept behind a small plant and squatted. The bird sat until I was about 20 yards away (it then being very hot) and then crept off trailing her wings ; the nest contained 3 eggs. She stayed quite close for some time and only rose when I walked right up to her.

From the above I gather that the male drinks first and then comes to relieve the female, which would appear to again relieve the male after drinking ".

Logan Home also obtained eggs from Tekrit on June 10th and, judging by the number of scrapes in the ground and the birds seen, quite a number must

have been nesting n fairly close proximity—on stony ground. Tomlinson records eggs from near Basra on June 19th and Pitman found a stale egg near Museyib on June 27th. Cheesman obtained a chick in down at Shaiba on August 12th when many were fully grown.

A clutch of 3 eggs in my collection taken by Capt. Hanna on July 3rd near Ur of the Chaldees measure 42·5×29. All three were fresh and similarly marked; the ground colour is pale yellowish stone ("pale olive buff", Ridgw. xl. f.) rather sparsely but evenly marked with fine and coarser spots of pale red-brown ("tawny olive" Ridgw, xxix, i.) with a few larger secondary markings of "pale violet grey," (Ridgw. lii, d.); they are less closely marked and much less glossy than those of the common Indian Sandgrouse, indeed they are practically glossless. The male bird which was on the eggs ran off at very close range and performed the usual "dying" trick.

All Sand-grouse are good eating in my experience but Pitman thought *senegallus* to be better in this respect than *alchata*. There is a certain amount of evidence to show that this species feeds on *only* small seeds and *not* on dropped corn, as *alchata* often does, although obtainable, but the identification of crop contents of both species and in a large number of specimens is desirable.

Eighteen specimens: Baghdad, 7-8-18 2, Nasariyeh, 25-8-18 (P.A.B.); ♂, Sheik Saad, 29-10-16. ♀, 30-10-16; *pull.* Shaiba, 12-8-18 (P. Z. C. and R. E. C.); 2 ♂, Twin Canals, 3-11-18; ♀, Kut, 24-11-16 (C. R. P.) 5 ♂, 3 ♀ nr. Kut (Keary and Perreau).

Down Plumage.—So far as I am aware the young in down of this species has never been described. Cheesman's bird is of the same age as the young of *alchata* referred to and, as the feathers have sprouted the down pattern is lost. *Chicks soon after hatching are desiderata*, as I believe this to be the only one preserved anywhere. I exhibited it at the December 1920 meeting of the B. O. C. and it is now in the British Museum.

Compared with the chick of *alchata* it has a noticeably smaller, less stout and less high bill, and shorter feet besides a different (paler) down and feather pattern.

Down. Upper parts.—Head, cheeks and ear coverts, a mixture as in *alchata*, but the ginger brown element much paler and their hair like filaments much shorter and less noticeable. Back and scapulars,—here the paler ginger colour of *alchata* is replaced by a pale sandy yellow with heavier black tips, here too the filaments are shorter than in *alchata*; wing coverts a mixture, like the back, and the filaments again shorter than in *alchata*.

Under parts.—Down fluffy, less hair like than in *alchata*, also not so white, more isabelline white.

Feathers of the upper parts quite different to *alchata*, pale isabelline brown grizzled with black marks; those of the under parts paler than in *alchata*, also smaller and more disintegrated. See plate p. 650.

324. Imperial Sand-grouse. Pterocles orientalis.

Pterocles orientalis (= *arenarius* auct.) (Syst. Nat. Ed. x, p. 161, 1758 —Anatolia).

Scattered flocks may be met with in winter throughout the country; these are winter visitors from the Persian plateau where they breed in great numbers; there is no evidence that it breeds anywhere in our area. Never what might be called common, yet it cannot be considered rare, small flocks may be met with by themselves, or a few mixed up with the packs of *alchata* or *senegallus*. They arrive somewhere about the middle of November and Cheesman records some as late as April 27th drinking at islands in the Karun river at Qazarieh.

Apart from their size, lack of the "pin tail", and the black belly Cheesman noted that their cry was distinctive, a croaking noise rather like a Raven's; Wimshurst obtained a number of minute seeds, estimated at 30,000, out of a

crop, which were identified by Mr. Irving of Kew as those of *Melilotus*, sp., probably *indica*, and *Astragulus*, sp., in about equal proportions.

One skin obtained : Sheik, Saad 24-12-16 (P. Z. C. and R. E. C.).

325. Large Pin-tailed Sand-grouse. Pterocles alchata.

Pterocles alchata caudacutus (Gm.) (Reise d. Russ. iii, p. 93, 1774—N. Persia).

This is *the* Sand-grouse of Mesopotamia ; it is widely distributed, resident, and in most places excessively abundant. There are a number of records of the migrations of vast flocks in March in several areas, as in Kut, Feluja and Baghdad, etc., and again in the autumn from August to the end of October. These movements are accounted for in two ways ; this species has its own favourite nesting areas and breeds there in large scattered colonies, and so towards the nesting season birds draw towards these favoured places from districts where they have spent the winter. Other movements are doubtless explained by their flights to their drinking ground and to their feeding grounds ; also the latter sites are changed as frequently as the food supply is exhausted, or become untenable due to flooding or other causes ; then again in the rainy season these birds can push further out into the desert, not being dependant on the rivers and canals for their water, and so in this way perform a local migration.

There is no evidence at all that any Sand-grouse of this species visits our plains as either a summer or winter visitor, and all the movements noted are no doubt purely local.

Like all Sand-grouse this species is somewhat local ; in some places it swarms in countless myriads and yet large stretches of country may be traversed without seeing one ; the key to this of course must be food supply. Although it may be said to be in winter widely distributed throughout the country and very common, I will give one or two instances to show its erratic distribution ; Cheesman found it abundant at Kifri in January, but on a journey from Kanikin to Mosul none were seen ; Buxton, at Amara, says they are there in very irregular numbers throughout the year except in December and January, sportsmen agreeing that it was absent in mid winter there every year ; yet Pitman saw a large flock near there in January. Doubtless in this case different parts of these areas were worked with the above varying results. Most agree that it is uncommon at Nasariyeh.

This Sand-grouse breeds throughout our area from Ras-el-Ain and Mosul to Basra and Ahwaz, though there again its distribution is somewhat local and in some places as at Hindia, Feluja and Amara it is quite scarce or sporadic, or as round Baghdad where it is said not to breed at all ; in other places as Ahwaz, Tekrit, Mendali it is pretty common, while round Kut, Sinn Banks and Sheik-Saad enormous colonies exist. Pitman who was in this latter district during the breeding season and found many nests, has furnished a number of notes on the nesting of this species. Here he found these Sand-grouse very abundant in April and towards the end of the month they shewed evident signs of wanting to nest, but were much worried by the presence of troops on what was probably their old breeding grounds, and by the incessant firing of field guns and howitzers. The first eggs were found on April 25th, but it was not until the middle of May that nesting was in full swing, and he thinks that the birds had been delayed by the firing in starting nesting operations.

There must have been thousands of pairs in a few square miles of country and not a few of them were nesting between our lines and the Sinn position.

The " nest " is situated preferably on dry open flat ground especially on the dry outskirts of what had been a mud-marsh, though some were found in short stubble and grass. No nest is made but in a few cases a few bits of straw were found in the nest. The usual clutch is three eggs ; in one case two were normal in size and the third no larger than a dove's egg. Of twenty eggs taken by

Ludlow at Ahwaz the largest measured 49 × 31, the smallest 39 × 28·5 and the average 44·36 × 30mm., these eggs varied very much in colour, they were mostly of a pale creamy-buff ground colour with dark brown or red-brown primary and violet grey secondary markings ; two eggs were nearly white, one with a few secondary markings, the other with a few faint markings of both degrees.

Pitman came to the conclusion that the eggs, once incubation had started, were never left unless the birds were compelled to, or the heat would kill the embryo ; he found many stale deserted eggs which were so hot as to be hardly handled ; Logan Home however says they sit very little !

Pitman several times saw the male sitting on the nest, but probably incubation is shared by both sexes, though the male was noted in each case on the eggs in eight nests found by Livesay. On being put off a nest with eggs, the incubating bird sneaks away, the head being kept low, and does not shew up till a long way from the nest, or it may feign a broken wing when 30 yards from the nest, this performance in nearly every case being done by the male. When the young are hatched more violent are the wiles utilized to deceive, which Pitman describes as follows :—" On the evening of June 15th I witnessed an interesting spectacle at a nest I had been watching and the eggs of which had hatched that morning. I saw the male sitting not far from the nest, but he at once went off playing the " broken wing " game ; as I got up to the nest the hen flew off under the pony's nose, having sat very tight and went away with a tremendous performance. First of all she went staggering away, then rolled over and over as if badly wounded and with both wings smashed. This not having drawn me away she went off again with tail elevated, wings drooping, and trailing on the ground head down and neck outstretched, every feather especially on the under parts fluffed out ; after a little of this display she got up and flew away."

Many nests were found in June and young in July and early August, but it is not certain that more than one brood reared ; many nests are destroyed by grass fires (burnt patches were found dotted with hundreds of semi-roasted eggs), Jackals, foxes, snakes, and birds of prey, so that late nests may well occur due to these causes. In August family parties or small flocks of seven to ten indivi duals are the usual thing, but later on the flocks mass into enormous packs.

At drinking time the flocks pack together on bare land before coming down to the water ; as all sportsmen know these birds have their favourite places for drinking, and where water is limited enormous numbers may here congregate ; in July, Pitman noted the first flocks arrive about 5 a.m., followed by other flocks, which all packed on the bare ground near by ; the whole lot rose with a deafening roar at 7 a.m. to come down to the water ; so numerous were they that shooting was sheer murder and some could be knocked down with a stick as they flew in, while the stream bank of both sides was packed five or six deep with birds.

They usually wade in and get wet or even settle in shallow water ; some drink hen fashion and others like horses do ; they go off directly after drinking either separately or reforming packs. In June they water from 6 to 8 a.m., and again at 5 to 6-30 p.m., but some may be seen going to drink all day long ; in the cold weather they drink from 8 a.m. till noon. In the heat of the day the flocks pack together to rest, and again for the night after feeding.

Their food consists of tiny seeds of a small grass like shrub, grains of cereals, pieces of green leaves, etc., while from one bird, of many feeding on newly sown wheat and barley, two ounces of cereals were taken and at this time of year the damage done must be considerable.

Pitman noted that during a sand storm these birds get quite lost and may then come into tents or can be even knocked down with sticks in the open. They dislike rain and the accompanying wetting of their plumage, as they then fly very badly and moreover are apt to get their feet clogged and balled with the clayey soil. Directly an area becomes saturated with moisture all the

Sandgrouse move off to some drier district, and these local migrations from whatever cause are performed at a considerable height.

Their note is a harsh penetrating "Caa" followed by a softer "Craa"; both sexes too have an alarm note—"twoi," "twoi" "twoi".

3. Kumait, 17-11-17 (P. A. B.); ♂, Shaiba, 31-10-16; ♂ ♀, Sheik Saad, 3-10-16; ♂, Twin Canals, 22-11-16 (P. Z. C. and R. E. C.); ♂, Feluja, 14-4-17; ♀, 5-4-17; ♂ ♀, Samarra, 22-2-18 (C. R. P.); 2 ♀, Amara, 11-16 (Connor); ♂, Shaiba, 6-16 (Graham); Shaiba, 6-16 (Ingoldby); *pull*, Mendali 3-8-18 (P. A. B.).

Zarudny and Loudon have described (Orn. Monats. 1906, p. 132) a race *bogdanovi* from the Karun district. Mesopotamian birds compared with N. Persian birds shew no constant difference and I look upon this supposed race as being inseparable from *caudacutus*, and *bogdanovi*, therefore, a synonym.

The downy chicks of nearly all Sand-grouse are so little or else not known that I will give a description of the one obtained by Buxton. The chick has feathers sprouting and so the pattern is lost.

Down Plumage—Upper parts: Head, cheeks and ear coverts are a mixture running more or less in lines of (1) pale ginger brown with faint black tips, (2) creamy white; back and scapulars—a mixture of (1) and (2), the black tips on (1) more marked. This down is being pushed out by first feathers. Under parts are covered by a long, rather hair-like, down which is being pushed out by pale isabelline first feathers.

Wing coverts—On the lesser rows the down is pale ginger, on the rest creamy white. Everywhere the brown down carries long black hair-like filaments, especially noticeable on the head and neck; these filaments are carried one on each component of each tuft of down; the white down carries short white filaments longest on the coverts.

Feathers of the upper parts nut-brown with blackish border and whitish edges.

The downy young of this Sand-grouse was figured in the P. Z. S., 1866, plate 9.

326. Close-barred Sand-grouse. Pterocles lichtensteinii.

This Sand-grouse is evidently quite rare or very local. Magrath assures me that two or three were shot near Shaiba (whence the Society has a skin) and that he personally handled them, and he also met with it at Sanniyat. The Arabian desert border is the most likely place for it, as rocky hills are not far distant and it might occur along the Jebel Hamrin foot-hills; however there are no other records on which reliance can be placed. Zarudny records a supposed race of this Sand-grouse, *arabicus*, as a winter visitor, but of all Sand-grouse, I believe the rock haunting species to be the most sedentary.

The Coronetted and Common Indian Sand-grouse were reported to have been seen but no specimens were obtained, and further confirmation is desirable; Zarudny gives the latter as a rare winter visitor, and Cumming thought he saw it flying over Fao.

327. See See. Ammoperdix griseigularis (= bonhami *auct.*)

Ammoperdix griseigularis ter-meuleni (Orn. Jahrb., 1904 p. 221—Karun District, S. W. Persia).

Common and resident wherever hilly country occurs, as in the Ahwaz-Shustar district and all along the Jebel Hamrin range to Mosul, the cliffs and ravines of the Diala and Adhaim rivers and the Tigris from Sindia to Fatah Gorge, and at Hit on the Euphrates. It is eminently a bird of stony hill sides, ravines and broken nullahs; on the plains proper it never occurs. Common where it occurs, it may be found in coveys up to twenty (which break up into pairs about February), but no large bags are made, as it much prefers running to flying, and it can get over broken ground far quicker than the sportsman can! The breeding season is May and June. Cheesman found a female containing eggs on May 2nd, but full

clutches are not to be expected till towards the end of the month. Aldworth found a nest of two eggs on May 13th in the ruins of Al-a-jib in the Samarra district, and Thornhill a clutch of eight on May 24th in the same district. Tomlinson has recorded the finding of nests at Bund-i-kir. Here the banks of the Karun are steep and rocky and about 40 feet high; from a likely looking hole about 10 or 12 feet from the ground a See See was flushed from the nest about two feet down the hole, the nest contained 11 fresh eggs on May 28th. Another nest on the same day was also in a hole about two and a half feet deep, like a small jackal's hole, in a sloping bank of a gully and contained 13 eggs. Mr. Jourdain informs me that the average of 23 Mesopotamian eggs is 36 × 25·8 mm.

Pitman noted that See See hide up in the day time and come out on to the plateau, scrub and camp areas to feed and drink morning and evening. The squeaky call note is rather like that of the *Ammomanes*.

Eight skins examined: ♂ ♀, Mendali, 3-8-18 (P. A. B.); ♂, Maidan-i-Naptun, 29-5-17. Shush, ♀, 3-5-17 (P. Z. C. and R. E. C.); ♀, Adhaim, 1-10-17, 11-11-17 (two); ♀, Samarra, 7-2-18 (C. R. P.)

There are also in the British Museum a pair from Bund-i-kir, a pair from Bushire and a male from "Mesopotamia."

Comparing this series with a series of typical *griseigularis* Mr. Kinnear and I have come to the conclusion that Zarudny's race is just recognizable (several sportsmen thought that the birds they got were different to the Indian ones). The Mesopotamian birds are, in the males, more sandy on the back and more vinous on the head; the more rusty coloration of the spots on the neck does not hold good; the females are distinctly paler and more marked in difference than the males. Wings: ♂ ♀, 121-140 mm. Young in down are desiderata.

Zarudny gives the typical race also as resident in small numbers in the Karun district, where his *ter-meuleni* is common!

328. Chukar. Alectoris græca.

Alectoris græca weræ (Zar. and Loud.) (Orn. Jahr. 15, p. 225—S. Lauristan and Arabistan).

There is little to record about the Chukar in our area, it certainly occurs in places in the Jebel Hamrin range as at Khanikin and Kizil Robat and probably elsewhere, while Brooking has recorded that a pair were seen in April near Hit on the Euphrates. There are two specimens in the British Museum labelled "Baghdad" obtained by Loftus, probably from the Jebel Hamrin, and Logan Home thought he saw it at Fatah Gorge.* It is common round Mosul. No specimens were brought home. I have examined these two Mesopotamian birds and five others from S. W. Persia and I think that *weræ* must be considered a distinct pale race. Wings: ♂ ♀ 155-179 mm.

329. Black Partridge. Francolinus vulgaris.

Francolinus vulgaris arabistanicus (Zar. and Harms.) (Ornith. Monats, April 1913—Arabistan).

The Francolin or Black Partridge is common in suitable places throughout our area; it is of course resident, inhabiting any thick scrub, especially tamarisk and liquorice, thick grass and cultivation of all sorts, a most favourite place being scrub along irrigation canals. Very good Black Partridge country is to be found between Kut and Sheik Saad and also up the Karun river. It is common in the scrub of the Tekrit flats, but at Samarra it is rare owing to unsuitable conditions.

The breeding season is May and June; Pitman at Feluja found three nests of five, seven and eight eggs respectively between the 6th and 8th of May and

* Since writing the above, Stoneham assures me that he knew of several obtained by sportsmen at Fatah, and I have heard of others being obtained in the more southern parts of this range

Cheesman found a brood hatched out at Amara on May 28th. A nest of five eggs is reported from Basra on June 1st,and a covey strong on the wing at the end of June at Kut, while a clutch of 6 eggs just hatching was found there on June 23rd. These discrepancies in dates of laying are doubtless due to accidents to first nests. The eggs vary much in colour; Cumming records four types—plain olive, dark olive, bluish olive and dark stone and the gives as measurements 1·6—2·0 × 1·2—1·35 inches (or in millimetres 40·5—50·5 × 30·5—34·3). The nest is a mere hollow in the ground and is placed usually in scrub and near water. The young are easily hand reared on flies, grasshoppers and grain.

The male starts calling early in March and calls up to July, a few do so in August and odd ones even in November, but as a rule it does not call in winter. Watts and Magrath, who both know the Indian bird well, considered that the call of the Mesopotamian bird was different; Ludlow and Thornhill both told me that the call had an extra syllable. The chicks make a noise like the chirrup of a cricket.

When Baghdad was first occupied this Partridge was common there but it rapidly became rare, and it was only a beneficent army order which saved it here and in other places from very serious diminution, a close season being instituted from March 15th to September 1st. They chiefly feed in the morning and evening, in the heat of the day they lie up in thick cover; where scrub is not available they may be found in the thick reeds along irrigation canals. From one bird shot at Beled 284 grains of barley were taken, but there is also a balance on the other side as Buxton found the crop of another bird crammed with the harmful locust *Decticus albifrons*, and probably the good they do outweighs the harm.

Nineteen specimens obtained: × Kut, 9-8-18; Amara, 28-5-18, 13-7-18, 17-1-18, 3-4-18, 4-11-17 ♀. 26-10-17, 20-10-17, 31-10-18 (P. A. B.); ♀, Qalet Saleh, 25-11-17: (two) ♀, Kumait, 28-2-18; ♀. Amara, 25-12-17, 25-9-17 (P. Z. C. and R. E. C.); ♂, Kut, 11-16 (Perreau); ♂, Kut (Robinson); ♂, Basra 20-11-.17; ♂, 21-11-17. (two) (C. B. T.)

Besides these I have seen also in the British Museum three more males and four females (including three from Arabistan), making in all a fine series of 14 males and 12 females. Mr. Kinnear and I had a very large series of the typical form, of Beluchi, Sind and N. W. Indian birds for comparison. The birds from Arabistan are quite the same as those from the Mesopotamian plains; they certainly do not belong to the typical form, which is a darker bird, and they match in coloration exactly the Sind race *henrici* but are larger. The wings of the 14 males measure 163-178 mm., and of 12 females 154-168 mm.; the Sind race does not even overlap these measurements.

As a rule, but not quite invariably, the rump and upper tail coverts in the Mesopotamian birds are tinged with rust, occasional Sind birds shew this and occasional Mesopotamian birds do not. In all the races we examined, the white chin and moustache, a character some have relied on, was found to be very variable in occurrence; it is a purely individual character. Also, the white check patch is very variable in all of these five races, both in shape and size, partly perhaps due to make of skin, but in *vulgaris* and *arabistanicus* the patch is usually more or less ticked with black, which in Sind and Beluchi birds is seldom the case. Another character in races of Black Partridge which has been relied on is the amount of white spotting on the under parts of the male, this is purely individual in all races examined and the apparent amount is often influenced by the make of the skin.

The young in down of this race are *desiderata*, also half grown birds; it is interesting to note that a feathered chick from Fao is so pale compared with a similar one from Nepal (*melanonotus*, the darkest race ot all) that one would hardly guess they belonged to the same species.

330. Quail. Coturnix coturnix.

Coturnix coturnix coturnix (L.) (Syst. Nat. Ed. x, p. 161, 1758—Sweden).

The Quail occurs chiefly as a passage migrant, arriving early in March ; the passage lasts throughout April and into early May ; as elsewhere they frequent scrub, grass land and crops. It is fairly common in suitable places on passage ; as a winter visitor it occurs sparsely, never very common, in suitable cover all over the country singly, in pairs, or in small lots. Some evidently stay to breed in the country as Livesay obtained eggs and Pitman saw a covey of cheepers at Kut in the middle of June and in July. The return passage apparently takes place in September. Bags of up to 27 brace were got on spring passage.

Five specimens : Daur, 22-10-18 (two) (P. Z. C. and R. E. C.) ♂, Sulimania, 11-19 (Ross) ; Amara, 21-9-18 ; Kuwait, 28-12-18. (P. A. B.)

C. B. T.

Literature.

1870-72. Although it contains little relating to Mesopotamia proper, mention must be made of Vol. II of *Eastern Persia on account of the Journeys of the Persian Bombay Commission*, 1870-72. Birds occupy pp. 98-304 of Vol. II, in which 284 species are recorded.

Occasional references chiefly to the bird colonies in the Persian Gulf will be found in Hume and Oates, *Nests and Eggs of Indian Birds*, 3 vols. (1889-90) and the Birds (4 vols.) of *the Fauna of India* by the same writers.

1882. Canon H. B. Tristram. Ibis pp. 402-419. Ornithological Notes of a Journey through Mesopotamia and Southern Armenia in 1881.

1886. R.B. Sharpe. *Ibis.* pp. 475-493. On a Collection of Birds from Fao in the Persian Gulf with field notes by W. D. Cumming (99 species, recorded, first account of breeding of *Hypocolius ampelinus*).

R. B. Sharpe. *t. c.* pp. 493-199. On a Collection of birds from Bushire in the Persian Gulf (53).

1891. R. B. Sharpe. *Op. Cit.*, pp. 103-116. Notes on a second Collection of Birds made by Mr. W. D. Cumming at Fao in the Persian Gulf (includes 95 species and notes on eggs collected).

1899. W. D. Cumming. *J. Bomb. N. H. S.* XII, p. 760 (Letter on the nesting of *Hypocolius ampelinus*).

1903. H. E. Witherby: *Ibis*, p. 501-571. An Ornithological Journey in Fars, South-West Persia. (Notes on 163 species.)

1904-9. (In 1903-4 Zarudny travelled and collected in Western Persia and the Ornithological results of his journeys are embodied in a series of short papers and descriptions of new forms chiefly in the *Ornith. Monatsberichte* and the *Ornith. Jahrbuch.* A complete list of these papers will be found in the *Journal fur Ornithologie*, 1911,pp. 188-189).

1904. N. Zarudny. *Orn. Jahrbuch*, xv, p. 108, *Passer mesopotamicus*, spec. nov.

1906. N. Zarudny and H. Baron, London. *Orn. Monatsber.*, XIV, pp. 133-134, Zum Material uber die Asiatischen *Pterocles* und *Columbæ.*

1907. H. F. Witherby. *Ibis*, pp.74-111. On a collection of birds from Western Persia and Armenia ; with field notes by Woosnam (168 species).

1910. Rev. F. C. R. Jourdain. *Bull. B. O. C.*, XXV, pp. 72-73 (Exhibition of Eggs collected by A. G. Tomlinson near Basra, etc.)

1911. N. Zarudny, *Journ. fur Ornith.*, pp. 185-241. *Verzeichnis der Vogel Persiens* (an important list with notes on literature, Zoological regions and a distributional list of 716 forms with some Ornithological Notes).

1912-13. H. Weigold. *cit.* Op. 1912, pp. 249-297, 365-410, and 1913, pp. 1-40 " *Ein Monat. Ornithologie in den Wusten und Kulturoasen Nord-westmesopotamiens und Inneryisiens.* (127 species.)

1912. N. Zarudny, U. M. Harms, *Op. cit.*, pp. 592-619 "*Bemerkungen uber einige Vögel Persiens*".

1912. M. Sassi. *Annalen d. K. K. Natur. Hist. Hofmuseums*, xxvi, pp. 116-119 *Liste von Vogelbalgen aus Mesopotamien* (List of 53 species chiefly collected at Mosul.)

1913. N. Zarudny, U. M. Hurms, *Journ. fur Ornithol.*, pp. 630-661, *Bemerkungen uber einige Vogel Persiens* II. Die Sperlinge Persiens.

1914. Capt. R. Meinertzhagen. *Ibis*, pp. 387-395. Notes from Mesopotamia.

1915. O. Neumann. *Journ. fur Ornithol*, pp. 118-123 "*Uber eine kleine Vogelsammlung aus Nord Mesopotamien*" [A small collection from Ras-el-Ain].

1916. N. B. K. (Kinnear). Notes on the Animals (Mammals, Birds and Reptiles) of Mesopotamia. [Birds, pp. 9-24 (Annotated list of 218 species based on Sharpe's and Witherby's papers published by the Bomb. N. H. Soc. and the B. M. Catalogue.)]

A. G. Tomlinson. *Journ. Bomb. Nat. Hist. Soc.*, pp. 825-829. Notes on the Birds of Mesopotamia. [Notes on 102 species observed chiefly near Basra and on the Karun R.]

1918. T. R. L. (Livesay). *Field*, 14th Dec. A Jheel on the Lower Euphrates [12 species recorded breeding].

Capt. C. B. Ticehurst. *Journ. Bom. N. H. Soc.*, XXVI, pp. 279-280. The Mesopotamian Bulbul.

W. D. Cumming. *t. c.* p. 292-295 Natural History Notes from Fao. (Corrections to the list of birds from Fao published in the *Ibis* of 1886 and 1891).

Capt. Thornhill. *Journ. Bom. N.H. Soc.*, XXV, p. 486. "Some notes on Game Birds of Mesopotamia."

1919. F. Kingdon Ward. *Field*, Jan. 18. "Notes on Mesopotamian Deserts."

H. F. Stoneham. *t. cit.*, May 17 and 24. "Bird Life in Mesopotamia."

Lieut.-Col. H. A. F. Magrath. *Journ. Bomb. N. H. Soc.*, XXVI, pp. 672-3. "Sand Grouse in Mesopotamia".

Maj-Gen. H. T. Brooking *t. c.* pp. 676-678. List of Birds observed in the Euphrates Valley.

Rev. F. C. R. Jourdain. *t. c.* pp. 860-1. "Mesopotamian Bird Notes" (Corrections to W. D. Cumming's paper, 1918).

C. H. Donald. *t. c.* pp. 845-6. "Some Birds of Prey of Mesopotamia."

Major R. E. Cheesman. *Bull. B. O. C.* XL, p. 59. (Exhibition of Nests and Eggs of *Passer moabiticus mesopotamicus*) (*c. f.* also *t. c.* p. 77.)

P. A. Buxton. *t. c.* p. 60 (Exhibition of skins of *P. moabiticus mesopotamicus*).

1920. Capt. H. F. Stoneham. "An Ornithological Record." (Printed privately).

Some scattered note on the skins and eggs collected by W. D. Cumming will be found in the *Catalogue of the Birds* and *Catalogue of the Eggs in the British Museum*, 1874-1912.

[*From the* JOURNAL OF THE BOMBAY NATURAL HISTORY SOCIETY, *April* 20, 1923.]

THE TERRESTRIAL ISOPODA OF MESOPOTAMIA AND THE SURROUNDING DISTRICTS.

BY

JOSEPH OMER-COOPER, F.L.S.

(*With 6 plates and 2 text figures.*)

During the last two years collections of Woodlice from the Mesopotamian Region have been sent to me for identification by Mr. Robert Gurney, M.A., Mr. W. Evans and Mr. R. G. Tame, and the specimens in the British Museum have also been examined. These collections contain in all about 150 specimens representing sixteen species of which six appear to be undescribed.

The identification of the specimens has been much facilitated through the kindness of the British Museum authorities, who placed their very extensive collections at my disposal, including the whole of the Budde Lund collection.

Through this I was able in the majority of cases to confirm the identification of the less common species by direct comparison with the type specimens. The Budde Lund manuscript was also consulted and proved of the greatest assistance.

I take this opportunity of expressing my most sincere thanks to the Museum authorities, and in particular to Dr. W. T. Calman, F.R.S., for the kindness which he has shown in giving me every facility to examine the specimens and consult the literature, and also for personally assisting me in the translation of various foreign publications.

The collections show no very striking features, most of the species being found also in Algeria, Egypt or Southern Europe, while the new species are also closely allied to species found in these regions, with the exception of *Periscyphis Tamei*, Sp. n., which appears to be most closely related to certain Central African forms.

The discovery of specimens of *Hemilepistus pectinatus*, Budde Lund, is however of considerable interest as they possess free coxal plates on the 2nd, 3rd and 4th trunk segments, a feature unknown previously in any normal genus of the Oniscoidea.*

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* Since this paper was in the hands of the printer I have found in a paper by Dollfus a reference to these coxal plates which is as follows :—

ANOMALONISCUS. Gen. Nov.

"Ce genre qui parait se rapprocher du genre *Alloniscus* Dana. s'en distingue par le singulier charactère suivant chez les ♀ les parties latérales des segments 2, 3 et 4 du pereion présentent une division très nette qui délimite un large coxopodite, analoque à celui qui s'observe dans le genre *Ligia*. Cè charactère est d'autant plus extraordinaire qu'il est limité à un petit nombre de segments et qu'il ne s'observe pas chez le mâle. Voici du reste la diagnose du genre" Adrian Dollfus 1893 Bull Soc. Zool de France. Tom XVIII p. 187.

Examination of the specimens of Alloniscus in the collection of the British Museum reveals the fact that the majority of species have a suture or groove between the coxal plate and the tergum in the 2nd, 3rd and 4th trunk segments only, and that this character is confined to the female sex.

I have also received a letter from Mr. Harold Jackson, M.Sc., who has been working upon the genus *Ligia* and who kindly examined a number as regards their coxal plates. His observations appear to me to be of considerable interest and I am therefore quoting the greater part of his letter.

"Your request has incited me to look into the point at once in the hope it will be of use to you and I have examined some 50 *Ligia* to-day with the following results: 24 of the specimens were male and 23 female." By "every segment" I mean "every thoracic segment."

Ligia exotica, Roux.

♀ 2, 3 and 4 separated by very deep grooves 1, slightly grooved, 5, 6, 7 progressively less deeply grooved towards the metasome.

♂ Exceedingly faint indications only (as a matter of fact I can quite excuse anyone unprovided with a first rate binocular microscope not seeing them at all).

L. pallasii, Brandt.

♀ Coxa on every segment separated by very deep grooves.

That another species, *Porcellio Calmani*, Sp. n., which shows this structure, should be found in the same district, is a remarkable coincidence especially as the genus *Porcellio* (to which *Hemilepistus* is very closely related is of great size and very widely distributed.

It is possible that a careful examination of the known species of *Porcellio* might reveal the presence of free coxal plates in other species as the suture lines are not very conspicuous, but though I have examined a considerable number of species I have not so far observed it.

In the examination of this collection, though no very large number of specimens were dissected, the variability of certain features was very noticeable.

A number of species from Northern and Central Africa and Great Britain have also been examined and these have also proved very variable.

In the majority of cases species have been described from specimens of one sex only and not infrequently from single specimens and as this fact is often omitted from the description considerable confusion arises.

The chief features in which I have found the sexes to differ are as follows:—

The size and distribution of the tuberculations.

The size and shape of the lobes of the head, though, this is rarely well marked.

The structure of the epistome, though but slightly.

The comparative and total length of the joints of the antennal flagellum.

The number of brushes on the mandibles and their distribution.

The shape, size, number and notching of the teeth of the outer endite of the maxillula.

The size and number of the spines of the peraeopoda. This is usually well marked especially in the first pair.

The shape and size of the second joint of the seventh peraeopod especially in *Periscyphis* and allied genera where it is usually very marked.

The length of the uropoda which are often much longer in the male than the female especially in the genus *Porcellio*, where in some South European and North African forms, the length of the uropoda in the male is very great.

♂ 2—6 deeply separated. Others with distinct shallow grooves.

L. Oceanica (Linn).

♀ Very deep grooves separating coxa on every segment.

♂ Distinct or deep grooves on every segment.

L. Olfersii, Brandt.

♀ 2, 3 and 4 very deeply grooved. In other segments absent or very faintly marked.

♂ Exceedingly faint indication or no trace of a division.

L. Cinerascens, B-L.

♀ Very distinct grooves on every segment.

♂ Very faint indications only.

L. Novae-Zealandica Dana.

♀ 2, 3, and 4 very deeply grooved, other segments more or less well marked.

♂ No specimens in my possession.

The result of this small investigation seems to me very interesting.

It is very obvious that the presence or absence of separated coxa in the *male only* is not without specific importance, as the character is remarkably constant in the species.

The females all agree in having the character more strongly marked in segments 2, 3 and 4 than any male. It is more or less marked in the other segments, but not so specifically distinct as to have much value.

(Signed) HAROLD G. JACKSON.

The principal variations which I have noticed amongst individuals of the same sex are :—

Size.—Very considerable differences are often found between individuals apparently adult.

Colour.—

The tuberculation of the body, but variation in this respect is not great.

The size and shape of the lobes of the head which vary to some extent with age and sex.

The development of the coxal and pleural plates and the degree of sinuosity of the hinder margins of the trunk segments, though this is not very well marked, is of some importance as these features have been made much use of by some systematists.

Number of ocelli.

Number of " olfactory " setae on the antennule.

Length of the joints of the antennal flagellum, though variation in this is usually slight

Number of brushes on the mandibles, and their arrangement. This character seems particularly variable.

The remaining mouth parts and the uropoda also show occasional variation, but this is not usually well marked.

A list of the species with the number of specimens from each locality is given below :—

List of species.	Amara.	Baghdad.	Kizil Robat.	Ruz N.E. of Baghdad.	Mosul and Korind.	Baku.
Cubaris officionalis (Dumeril)	19	..	4	..	..	..
Periscyphis (=*Cercocytonus*) *Tamei*, Sp. n.	2	..	..	4	..	..
Pareluma minuta, Sp. n.	9	..	..	..	..	..
Porcellio (*Porcellio*) *blattarius*, B-L.	2	..	..	..	..	..
,, (*Porcellio*) *Evansi*, Sp. n.	7	2	1	..	..	..
,, (*Roçopus*) *lævis* (Latr.)	5	10	..	..	..	..
,, (*Rogopus*) *Calmani*, Sp. n.	..	..	..	..	..	8
,, (*Angara*) *lenta* (B-L.)	3	..	..	..	..	..
,, (? *Agabiformis*) *rufobrunneus*, Sp. n. ..	5	..	..	..	..	..
Hemilepistus pectinatus, B-L.	..	..	..	..	15	..
Leptotrichus politus, Sp. n.	8	..	..	..	..	..
Porcellionides (=*Metaponorthus*) *litoralis* (B-L.) ..	9	..	..	..	..	..
,, ,, *swammerdami*, (Aud. & Savig.) ..	19	2	1	..	..	..
,, ,, *uniformis* (Koch).	8	.	..	..	..	..
,, ,, ? *pruinosus* (Brandt).	2	..	..	..	..	..
Philoscia elongata, Dollf.	7	...	..	..	..	..
	14	3	3	1	1	1

Cubaris officionalis (Dumeril).

Dumeril, 1816.

Localities.—Amara : Capt. P. A. Buxton, Capt. W. E. Evans, Mr. R. G. Tame.

Kizil Robat, N. E. of Baghdad: Capt. W. E. Evans, 4 specimens.

Periscyphis (=*Cercocytonus*) *Tamei*, sp. n. (Plate I).

Localities.—Amara: Mr. R. G. Tame, 2 specimens.
Ruz, N. E. of Baghdad: Capt. W. E. Evans, 4 specimens.

Description.—Body convex, capable of rolling into a ball, nearly smooth with a few small irregularly scattered setae and minute punctations.

Head with the lateral lobes small and the front straight. Epistome without marginal line and nearly flat. Antennal tubercles small and thin walled: clypeus rising steeply from the epistome which is slightly raised in the middle close to the origin of the clypeus. Eyes of moderate size with about 15 ocelli.

Mesosome with the coxal plate of the 1st free segment raised to form a rounded ridge separated by a deep groove from the tergum. This groove ends blindly behind, but in front is continued as a narrow and shallow depression which runs round the anterior edge of the segment behind the raised line which forms the articular edge; the outer collar line being a continuation of the raised coxal plate. The raised coxal plate is of a pale yellow colour and marked by numerous fine longitudinal striations; a condition which appears general where such raised coxal plates occur, for in all the species of *Microcercus*, etc., which I have examined, they have a similar appearance.

The hinder margin of the 1st segment nearly straight; the posterior angles rounded, with a deep notch which receives the edge of the 2nd segment when the animal rolls up: 2nd, 3rd, 4th, 5th and 6th segments with the hinder margins nearly transverse, without sinuosity, and the posterior angles rounded and entire: 7th segment with the posterior angles somewhat posteriorly produced and rounded.

Metasome with the pleural plates of the 3rd, 4th and 5th segments quadrangular.

Telson triangularly produced in the middle, and the apex a little rounded.

Antennules with three joints, the 2nd and 3rd joint being subequal and the 1st a little longer than the other two together; apex with about 12 "olfactory" setæ.

Mandibles: Right with 2 brushes. Left with 3.

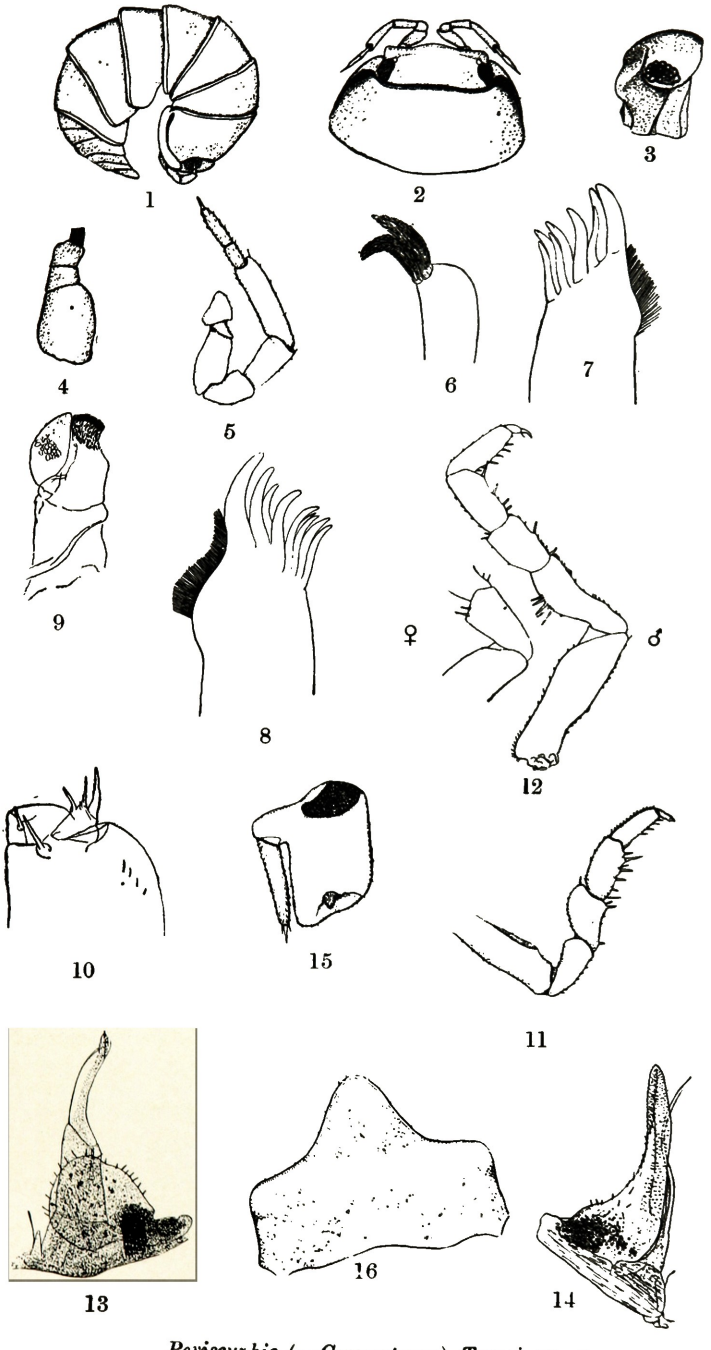
Antennæ slightly longer than the 1st trunk segment, 2nd joint a little longer than the 3rd which is slightly shorter than the 4th; flagellum biarticulate, the 1st joint about $\frac{1}{4}$th shorter than the 2nd.

Maxillulæ: Inner endite without posterior spine, with two long slender brushes, the lower being the longer. Outer endite in the female with 4 major teeth, all well developed, though the 2nd is slender, and 4 minor teeth, the 1st and 3rd slightly notched. In the male there are 4 major and 5 minor teeth and both are rather more curved than in the female. The minor teeth all have the apex entire or nearly so. It is possible that one of these conditions is abnormal as I have only dissected the two specimens.

Maxillae with the outer lobe a little wider than the inner, and without a basal lobe on the outer margin.

Maxilliped with the last joint of the palp produced as a stout spine. Middle region with two stout spines each having a small spine at the base, and there is a third small spine between the two stout ones. The basal joint of the palp has a single stout spine. Endite with one spine and without teeth.

Peraeopoda show marked sexual dimorphism especially noticeable in the number of spines carried by the 1st pair, which is small in the female



Periscyphis (=*Cercocytonus*) *Tamei*, sp. n.

THE TERRESTRIAL ISOPODA OF MESOPOTAMIA AND THE SURROUNDING DISTRICTS.

Explanation of Plate I.

Periscyphis (=*Cercocytonus*) *Tamei*, Sp. n.

1. Adult female.
2. Head and 1st segment of female.
3. Head of female side view.
4. Antennule of male.
5. Antenna of male.
6. Inner endite of maxillula of male.
7. Outer endite of maxillula of female.
8. Outer endite of maxillula of male.
9. Maxilla of male.
10. Maxillipede of male.
11. 1st peræopod of female.
12. 7th peræopod of male and part of 7th peræopod of female.
13. 1st pleopod of male.
14. 2nd pleopod of male.
15. Uropod of male.
16. Telson of male.

and large in the male, and in the 2nd joint of the 7th pair, which is short and stout in the female, and long and narrow in the male.

Pleopoda : 1st two pairs with pseudotracheæ.

Uropoda with basal joint flattened ; endopodite reaching nearly to the end of the telson, and the exopodite very small, and situated in a shallow pit on the upper surface of the basal joint a little behind its distal margin in a medium position.

Colour—Pale lemon yellow with dark chocolate markings. The coxal plates are yellow for the greater part of their width and in the anterior region of the segments this light area extends considerably on to the tergum but just behind the posterior margin—which is itself nearly white—there is a narrow dark band running nearly to the lateral margin of the segment. The median dark area is narrow anteriorly but becomes broader posteriorly, being widest in 5th, 6th, and 7th trunk segments. There are small light markings running down the median line. The head is yellow with a few indistinct dark mottlings. The metasome has the first two segments yellow and the last three somewhat darker with the pleural plates nearly white. The telson and uropods are very pale yellow and the legs and pleopods are nearly white.

Length, 10 m.m. *Breadth*, 4 m.m.

Remarks—This species is placed in the genus *Periscyphis* for the following reasons :—

Budde Lund 1885, formed the genus *Cercocytonus*, which he later 1908 (*a*) considered to be equivalent to Gerstaecker's *Periscyphis*, 1873. In 1910 he restricted the genus considerably, re-defined Dollfus *Synarmadillo*, and created the new genus *Microcercus*. More recently Stebbing, 1911, has formed the genus *Paraperiscyphis*, which is easily distinguished from Budde Lund's genera, and Pearse, 1915, the genus *Minca*,—which he has not very clearly defined and which appears to be very close to *Microcercus*. Collinge, 1914, considers *Periscyphis*, Gerst., distinct from *Cercocytonus*, B. L., which further complicates the matter and the whole group is badly in need of revision.

To add to the confusion, by the addition of a new generic name, would seem undesirable. I therefore place the species described above in the genus *Periscyphis*, while pointing out that it cannot be included in that genus as defined by Budde Lund, 1910, nor in any of the allied genera as he restricts them. It shows a close relationship in some respects to the genus *Microcercus* which is confined to Africa.

Pareluma, Gen.n.

Definition—Body convex, capable of rolling into a ball. Head with lateral lobes small, and antennal tubercles forming two curved and narrow ridges. Eyes small with several ocelli. 1st segment of the mesosome with the lateral margins thickened and notched posteriorly to receive the coxal plate of the 2nd segment. Flagellum of antenna biarticulate, the 2nd joint at least twice as long as the 1st. Telson triangular. Uropoda similar to those of *Armadillidium*.

Generotype—*Pareluma minuta*, Sp.n.

Remarks—This genus is very near to *Eluma* but may be easily distinguished from it by the eyes, which consist of but one ocellus in *Eluma*.

The following species are included :—

Armadillidium Davidi, Dollf.
" *Festie*, "
" *fissum*, "
" *granum*, "
Armadillidium hybridum, B. L.
" *Oertzenii*, B. L.

Pareluma minuta, Sp.n. (Plate II).

Locality—Amara: Capt. W. E. Evans, 13th November 1918.

9 female specimens.

Description—Body convex, capable of being rolled into a ball; surface smooth, with a few setae irregularly scattered.

Head with the lateral lobes small and the front almost straight. Epistome with distinct marginal line, and a median tubercle forming a distinct ridge. Antennal tubercles well developed, forming two curved ridges running upwards and inwards. Eyes small with about 6 ocelli.

Mesosome with the 1st free segment notched to receive the coxal plate of the 2nd. Edges of all the coxal plates a little thickened: Collar line indistinctly double, the outer line becoming obsolete in the middle dorsally.

Posterior angles of all the segments rounded and hinder margins nearly transverse.

Metasome with the pleural plates of the 2nd, 3rd and 4th segments subquadrangular.

Telson triangular with the apex broadly rounded.

Antennulæ three jointed, 1st joint about $\frac{1}{3}$rd longer than 3rd, 2nd very short; apex with about 7 " olfactory " setæ.

Antennæ reach to the 3rd trunk segment.

The 2nd, 3rd and 4th joints subequal, the 3rd being the shortest while the 4th is a little longer than the 2nd, and the 5th about as long as the 3rd and 4th together. Flagellum biarticulate and about as long as the 5th joint of the peduncle; the 2nd joint about 3 times as long as the 1st and with a stout apical bristle.

Mandibles: Right with 3 brushes, one on the setose pad and two below. Left with 5 brushes, two on the pad and three below.

Maxillulæ: Inner endite with a rather long posterior spine and two short and moderately stout brushes. Outer endite with 4 major teeth—of which the 2nd is very slender but only slightly shorter than the others—and 5 minor teeth—all with the apex entire.

Maxillæ with the outer lobe wider than the inner, and a basal lobe on the outer margin.

Maxillipedes with the last joint of the palp ending in a tuft of setæ; middle region with two stout spines—the inner being the longer; and basal joint with two stout setæ. Endite with a single setæ and three teeth, of which the outer is of medium size, the middle large and curved, and the inner very small.

Pleopoda—1st two pairs only with pseudotracheæ.

Uropoda similar to those of *Armadillidium*: basal joint notched externally: Endopodite flattened, reaching just beyond the telson: Exopodite slightly shorter than the endopodite, flattened, nearly quadrangular.

Colour—Reddish brown with pale yellow or brown spots. Coxal plates pale yellow. Antennae brown, legs, pleopods and uropods nearly white.

Length, 5 m.m. *Breadth*, 2 m.m.

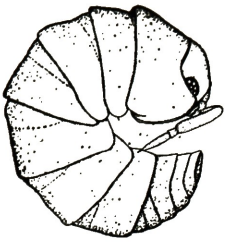
Porcellio (*Porcellio*) *blattarius*, B. L.

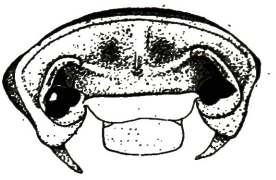
Budde Lund, 1885, p. 131.

Locality—Amara. April-May 1918, Capt. P. A. Buxton, 2 ♀ specimens.

Description.—Body oblong oval, not very convex; surface smooth, with fine setae, punctations, and a few small tubercles, most prominent posteriorly.

Head with lateral lobes well developed and rounded; median lobe small, semicircular, and entire. Epistome raised in the middle but without a median tubercle in the female, Budde Lund's description " Epistoma medio





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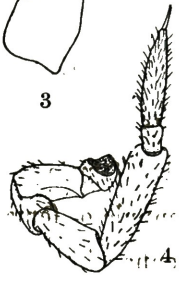

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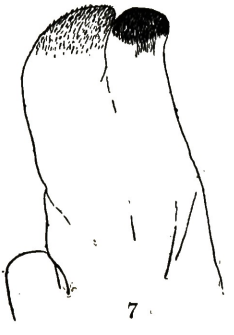

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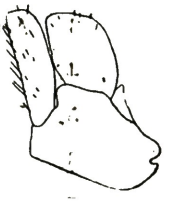

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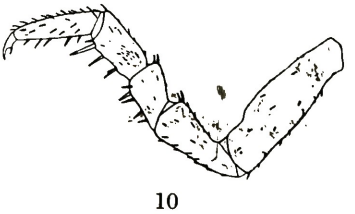

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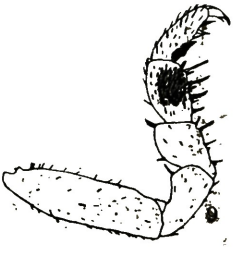


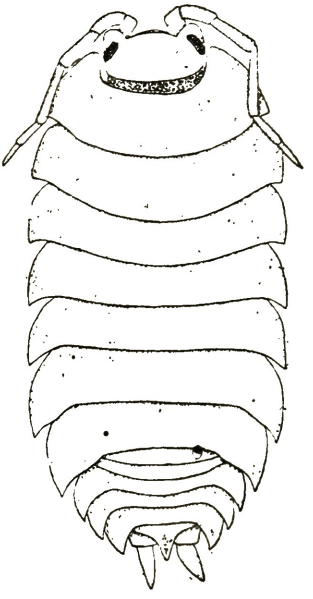
Pareluma minuta, sp. n.

Explanation of Plate II.

Pareluma minuta, Sp. n.

1. Female, ? Adult.
2. Head of female front view.
3. Antennule of female.
4. Antenna ,,
5. Inner endite of maxillula of female.
6. Outer endite of maxillula of female.
7. Maxilla of female.
8. Maxillipede ,,
9. 1st peræopod of female.
10. 7th peræopod of ,,
11. Uropod of ,,

tuberculo obtuso '' applies to the male only. Eyes composed of about 25 large ocelli.



Text Fig. 1. *Porcellio* (*Porcellio*) *blattarius*, B. L.

Mesosome with the posterior margins of the 1st, 2nd and 3rd segments a little sinuous and the hinder angles sharp. Anterior articular surface of 1st segment with a single collar line dorsally.

Metasome with the pleural plates of the 3rd, 4th and 5th segments triangular and the angles sharp pointed.

Telson subtriangular, with the sides incurved and the apex subacute. Dorsal surface markedly excavated towards the apex.

Antennæ reaching a little beyond the posterior margin of the 2nd trunk segment: 2nd and 3rd joints subequal, the third slightly the longer and both obtusely dentate, 4th joint about $\frac{1}{3}$rd longer than the 3rd, and 5th as long as the 3rd and 4th together.

Flagellum biarticulate, nearly as long as last joint of peduncle; 1st joint a little longer than 2nd in both sexes. Budde Lund's description " Flagelli articulus prior altero fere duplo longior " does not agree with the female specimens from Mesopotamia, nor with the male specimen in his own collection ; but I have found that the comparative length of the joints of the flagellum varies somewhat with age and sex in the genus *Porcellio*.

Maxillulæ : Inner endite with a small curved posterior spine and two brushes, of which the lower is the longer. Outer endite with 4 major and 6 minor teeth of which the 1st, 3rd, 4th and (?) 6th are notched and the 2nd and 5th slender and entire.

Maxillipedes with the palp ending in a tuft of small setæ ; the middle region with 2 spines, the outer with 3 and the inner with one seta at the base. Endite with one spine and 3 teeth of which the innermost is small.

Pleopoda : 1st two pairs only with pseudotracheæ. 1st pair in the female large subquadrangular nearly meeting in the middle line.

Uropoda with the basal joint rather widely notched externally : endopodite projecting very slightly beyond the extremity of the telson: exopodite short, lanceolate, with a ridge externally.

Colour—Grey, with a series of white marks near the bases of the coxal plates, and a white spot at a short distance from the margin of each segment near to the hinder angle. There are also obscure yellow and reddish markings on the back. Antennæ dark grey, legs and uropods nearly white.

Length, 17 m.m. *Breadth*, 8 m.m.

Remarks—This species is represented in the Budde Lund collection by a single small male specimen of a yellowish brown colour—which is probably due to its having been kept for many years preserved in alcohol in a corked tube. It has been carefully compared with the female specimens from Amara and the points of difference are so slight that there can be little doubt that they belong to the same species.

As a certain amount of confusion has existed regarding this species (see Budde Lund M.S.) and the original description is insufficient I have redescribed it above from the two females from Amara.

Porcellio (*Porcellio*) *Evansi*, Sp. n. Plate III.

Localities—Amara, Capts. C. L. Boulenger, P. A. Buxton and W. E. Evans.

Baghdad : Capts. C. L. Boulenger and W. E. Evans. Kizil Robat N. E. of Baghdad : Dec. 1918, Capt. W. E. Evans.

Description—Body oblong oval, moderately convex, with the coxal plates somewhat flattened ; surface with numerous tubercles arranged in irregular transverse rows.

Head with the lateral lobes well developed, rounded and sloping slightly upwards ; frontal lobe obtusely triangular and deeply notched in the middle, the sides of the notch being raised as distinct prominences. In one specimen examined these had coalesced so that the apex of the triangular frontal lobe was entire and appeared as a single upwardly directed prominence. Epistome flattened, with distinct marginal line, and a well developed median tubercle, which has its apex sharp pointed and directed upwards. It may be seen from the dorsal surface as a small pointed tubercle projecting as far as the two median prominences of the frontal lobe and visible in the notch between them. Eyes with about 25 large ocelli.

Mesosome with the coxal plates projecting laterally : anterior articular surface of the 1st segment with an indistinctly double collar line : 1st, 2nd and 3rd segments with the hinder margin sinuous and the posterior angles acute.

Metasome with the pleural plates of the 3rd, 4th and 5th segments triangular and the angles sharp pointed.

Telson sub-triangular, with the sides much incurved and the apex very slightly rounded.

Antennulæ with the 1st joint twice as long as the 2nd, which is $\frac{1}{3}$rd shorter than the 3rd ; a small patch of " olfactory" setæ near the apex.

Antennæ reaching to the posterior margin of the 3rd trunk segment : 2nd and 3rd joints subequal, the 3rd being the longer, 4th about $\frac{1}{3}$rd longer than 3rd, 5th as long as the 3rd and 4th together. Flagellum biarticulate, 1st joint about $\frac{1}{3}$rd longer than the 2nd in the female, while in the male it is twice as long. This is a well marked sexual difference,

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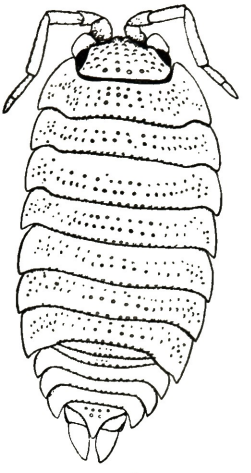

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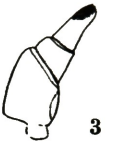

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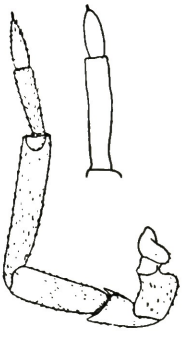

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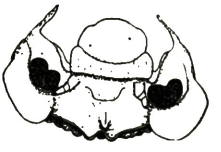

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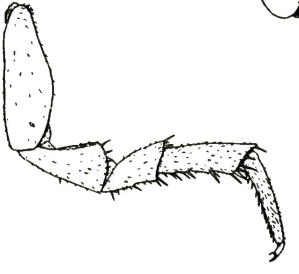

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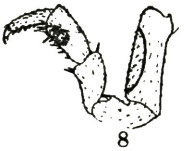

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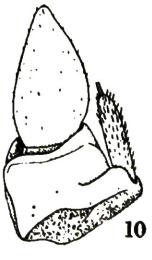

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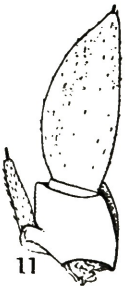

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Porcellio (Porcellio) Evansi, sp. n.

THE TERRESTRIAL ISOPODA OF MESOPOTAMIA AND THE SURROUNDING DISTRICTS.

Explanation of Plate III.

Porcellio (*Porcellio*) *Evansi*, Sp. n.

1. Adult female.
2. Head of female front view.
3. Antennule of female.
4. Antenna of female and flagellum of male
5. Inner endite of maxillula of female.
6. Outer endite of maxillula of female.
7. Maxillipede of female.
8. 1st peræopod of female.
9. 7th ,, ,, ,,
10. Uropod of female.
11. Uropod of male.

though the relative lengths of the joints of the flagellum show a certain amount of variation amongst the female specimens examined.

Mandibles : Right with 5 brushes, all below the setose pad. Left with 9 brushes, 2 arising from the pad.

Maxillulæ : Inner endite with posterior spine small and curved and two long slender brushes. Outer endite with 4 major and 6 minor teeth, of which the 1st, 2nd, 3rd, 4th and 6th have the apex deeply notched on the inner side.

Maxillæ similar to those of *P. scaber*.

Maxillipedes with the last joint of the palp ending in a long curved and slender spine, below which are a number of small spinous setæ : middle region with two long slender spines, each with a small setæ at the base, between is a third small spine ; basal joint with 2 stout setæ. Endite with 3 small teeth of which the innermost is largest. Basipodite markedly imbricated, with numerous stout setæ scattered irregularly all over it.

Pleopoda with 1st two pairs only with pseudotracheæ. 1st pair subquadrangular and do not meet in the middle line though not widely separated.

Uropoda : Endopodite not projecting beyond telson : Exopodite rather small, considerably dorso-ventrally flattened in both sexes, but more conspicuosly in the male, in which it is also large.

Colour—Bright yellow with the tuberculation dark grey or brown : head dark grey : metasome with a broad dark band covering segments 3, 4, and 5 with the exception of their pleural plates, which are nearly white. Telson yellow, with one or two dark blotches. Uropoda yellow at base shading to dark grey brown at apex. Legs and pleopods light yellow.

Length, 14 m.m. *Breadth*, 6-5 m.m.

Remarks—This species though apparently abundant and rather striking in appearance does not seem to have been described previously.

It belongs to the sub-genus *Porcellio*, as defined by Budde Lund, and is very like the *Porcellio magnificus* of Dollfus (1892), but differs from it in its smaller size and in the shape of the uropods.

Porcellio (*Angara*) *lenta* (B.L.)

Budde Lund, 1885, p. 230.

Locality—Amara : Capt. P. A. Buxton, 3 specimens.

Porcellio (*Rogopus*) *lævis*, Latr.

Latreille, P. A., 1804.

Localities—Amara. Feb. 1918. Capt. W. E. Evans, 4 specimens. Baghdad. 12th Sept. 1917. Capt. P. A. Buxton, 10 specimens.

Porcellio (*Rogopus*) *Calmani*, Sp.n. Plate IV.

Locality—Baku : 1919, Capt. P. A. Buxton, 8 ♀ specimens

Description—Body oblong oval, not very convex, surface smooth and punctate, with a few ill-defined corrugations.

Head with the lateral lobes small and curved outwards, and median lobe very small and arched. The epistome smooth and arched, without median tubercle ; marginal line distinct, and continuous with the edges of the lateral lobes. Eyes with 20—25 small ocelli.

Mesosome with the coxal plates of the 2nd, 3rd and 4th free segments separated from the tergum by clearly defined suture lines. The 1st, 2nd and 3rd segments with the posterior margins transverse, without sinuosity, and the hinder angles rounded.

Metasome rather sharply narrower than the mesosome, with the pleural plates of the 3rd, 4th and 5th segments triangular and sharp pointed.

Telson with the sides at first sloping sharply inwards and then bending at an obtuse angle to run straight to the apex, which is very sharply pointed. The produced middle portion forms a nearly equilateral triangle, slightly excavated dorsally.

Antennulæ with the 1st joint nearly twice as long as the 2nd, which is about the same length as the 3rd. Apex with a large number of short "olfactory" setæ.

Antennæ long and slender with the 2nd, and 3rd joints subequal, the 2nd being a little the shorter, both dentate; 4th joint nearly as long as the 2nd and 3rd together, and about $\frac{1}{4}$th shorter than the 5th. Flagellum equal in length to the 5th joint of the peduncle, biarticulate, with the 1st joint about $\frac{1}{4}$th longer than the 2nd.

Mandibles both with 7 brushes, one of which is on the setose pad.

Maxillulæ: Inner endite with long and slender posterior spine, and two long slender brushes. Outer endite with 4 major and 6 minor teeth, all with the apex entire and sharp pointed.

Maxillæ with the inner lobe a little wider than the outer, which in the type specimen had the upper edge sloping downwards and nearly straight as figured both in the right and left maxillæ; in another specimen however it was more rounded and of the usual type found in the genus *Porcellio*. There is a basal lobe on the outer margin.

Maxillipedes: Apex of the palp covered with small closely apposed setæ; middle region with 2 stout spines, each with a small spine at the base; basal joint with 2 spines. Endite with 2 teeth close to the palp, the inner distal angle is raised but does not appear to be a true tooth.

Peræopoda rather long, increasing considerably in length from 1st to 7th.

Pleopoda: 1st two pairs only with pseudotracheæ. 1st pair with the exopodites large and subtriangular.

Uropoda with the basal joint deeply notched externally: endopodite barely reaching to the apex of the telson: Exopodite long and lanceolate, with the inner edge almost straight, and the outer a little curved with a well defined ridge.

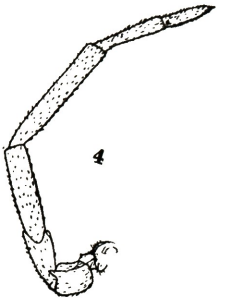
Colour—Purplish brown, with the hinder margins of the segments dark yellowish brown, sides of body with a white or pale yellow border.

Length, 18 m.m. *Breadth*, 8 m.m.

Remarks—This species which is of peculiar interest has been named after Dr. W. T. Calman, F.R.S., the celebrated Carcinologist as a mark of the great admiration and respect which I feel for him.

On an examination of the specimens upon which the description has been based, it was found that the coxal plates of the 2nd, 3rd and 4th free segments (3rd, 4th and 5th segments) of the mesosome were separated from the tergum by a well defined suture, a condition hitherto only known in the Oniscoidea in the aberrent genus *Tylos*. Dr. Calman in his volume on the Crustacea in Lankester's Treatise on Zoology, speaking of the suture line between the coxal plates and the tergum in the Isopoda, says:—"This condition is found in the *Cymothoidea*, *Serolidæ*, some *Sphæromidæ* and in the *Tylidæ* among the Oniscoidea. When the suture line disappears as in most Oniscoidea it is impossible to distinguish the coxal palate from a true pleuron."

In the *Ligiidæ* the coxal plate is marked off from the tergum by a depression, but thisis not a true suture. Possibly a more careful examination of the known species of Oniscoidea might result in the discovery of free coxal plates in others, as I have found a well marked suture in the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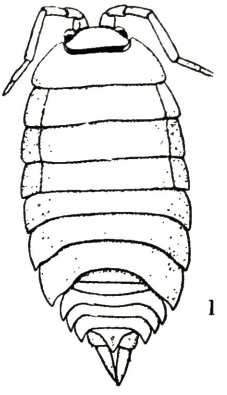
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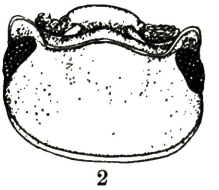
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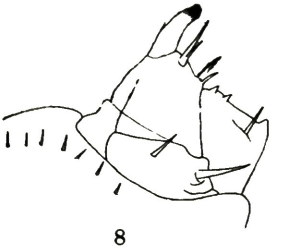
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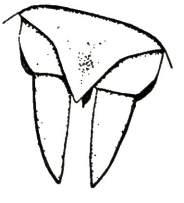
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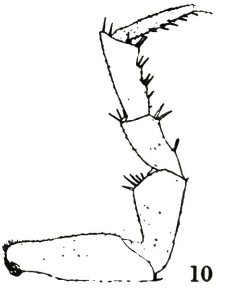
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Porcellio (*Rogopus*) *Calmani*, sp. n.

Explanation of Plate IV.

Porcellio (*Rogopus*) *Calmani*, Sp. n.

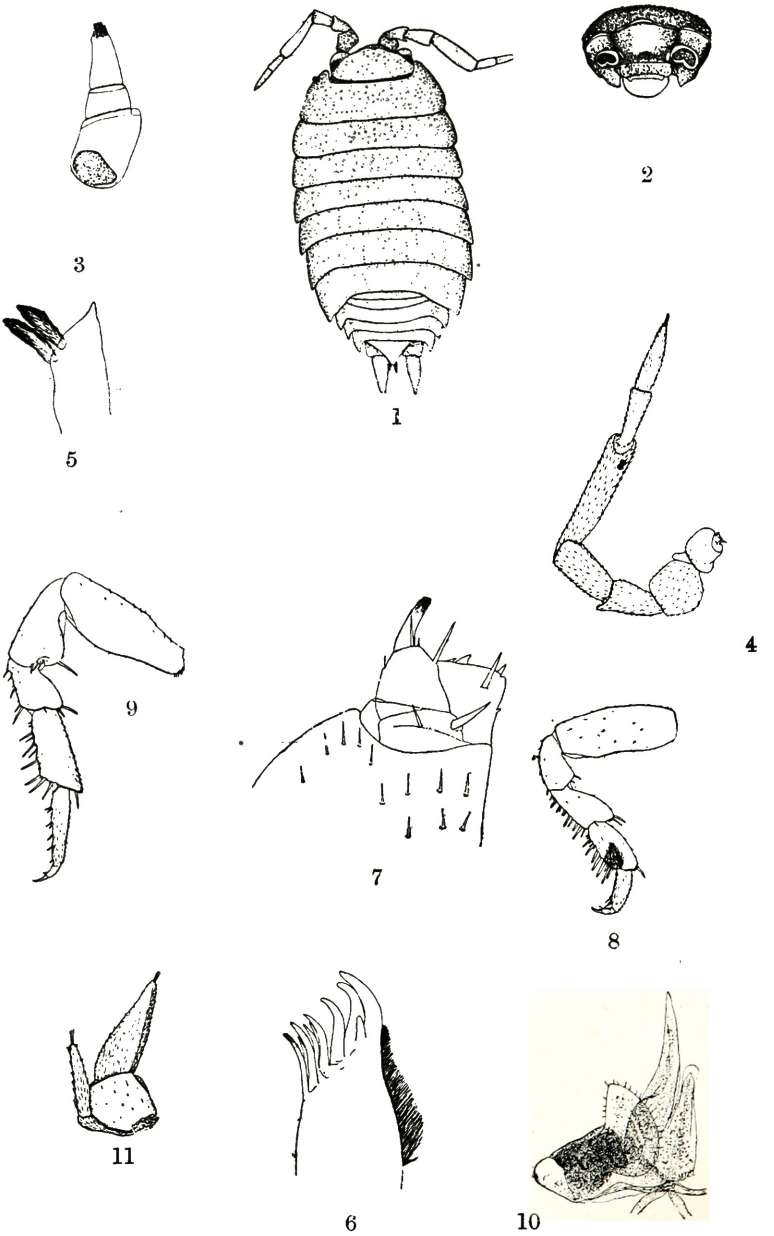
1. Adult female.
2. Head of female.
3. Antennule of female.
4. Antenna ,,
5. Inner endite of maxillula of female.
6. Outer endite ,, ,, ,, ,,
7. Maxilla of female.
8. Maxillipede of female.
9. 1st peræopod of female.
10. 7th ,, ,, ,,
11. Uropoda and Telson of female.

THE TERRESTRIAL OSOPODA OF MESOPOTAMIA AND THE SURROUNDING DISTRICTS.

Explanation of Plate V.

Porcellio (? *Agabiformis*) *rufobrunneus*, Sp. n.

1. Adult male.
2. Head of male front view.
3. Antennule of male.
4. Antenna of male.
5. Inner endite of maxillula of male.
6. Outer endite ,, ,, ,, ,,
7. Maxillipede of male.
8. 1st peræopod of female.
9. 7th ,, ,, ,,
10. 1st pleopod of male.
11. Uropod of male.



Porcellio (*? Agabiformis*) *rufobrunneus*, sp. n.

case of *Hemilepistus pectinatus*, B. L., a species also occurring in this region.

Porcellio (? *Agabiformis*) *rufobrunneus*, Sp. n. Plate V.

Locality—Amara : 13th Feb. 1918, Capt. W. E. Evans, 1 ♀ 4, ♂ specimens.

Description—Body oblong oval, about twice as long as broad, not very convex ; surface covered with numerous minute setæ, many small granulations, and obscurely tuberculate.

Head with the lateral lobes small and rounded, frontal lobe small, almost semicircular and a little raised in the middle, Epistome smooth, rather bulbously produced in the middle but without median tubercle. Marginal line clearly defined and a little raised. Eyes small with 15 ocelli.

Mesosome with coxal plates small and sloping downwards. 1st segment with the collar line double, the two lines being well separated and distinct throughout their length : hinder margins of the 1st, 2nd and 3rd segments without sinuosity and the posterior angles rounded, 4th with a little sinuosity and the hinder angles moderately sharp ; the remaining segment show progressively greater sinuosity and sharper angles.

Metasome with the pleural plates of the 3rd, 4th and 5th segments subtriangular.

Telson triangular, with the sides almost straight ; dorsal surface slightly if at all excavated.

Antennulæ with 1st joint a little longer than the 3rd, and 2nd about ⅓ as long as 3rd. Apex with numerous fine " olfactory" setæ.

Antennæ reaching to the posterior margin of the 3rd segment ; 2nd, 3rd and 4th joints subequal, 2nd dilated, a little shorter than 3rd, 3rd and 4th equal in length, 5th as long as 3rd and 4th together. Flagellum almost as long as 5th joint of peduncle, biarticulate, with the 1st joint very slightly shorter than the 2nd.

Mandibles both with 4 brushes, one arising from the setose pad. In the type specimen the right mandible was unfortunately lost and the left showed only 3 brushes, one on the pad, but a fourth may have been broken off.

Maxillulæ : Inner endite with a well developed posterior spine and 2 moderately long brushes almost exactly equal in length. Outer endite with 4 major teeth—one of which is very small—and 6 minor—all sharp pointed and entire.

Maxillæ with the inner lobe smaller than the outer, and a small basal lobe.

Maxillipedes : Apex of the palp with numerous setæ ; middle region with two well developed spines and at the base of the outermost two small setæ ; basal joint with two spines. Endite with one spine and three teeth, the outer small and the other two large.

Peræopoda show a slight sexual dimorphism of the usual type.

Pleopoda : 1st two pairs only with pseudotracheæ. 1st pair in female small and do not meet in the middle line, exopodite with posterior edge almost straight and transverse and the inner roundly curved.

Uropoda with the basal joint notched externally : endopodite projecting about ⅓rd of its length beyond the telson ; exopodite rather short, with a ridge on the outer margin.

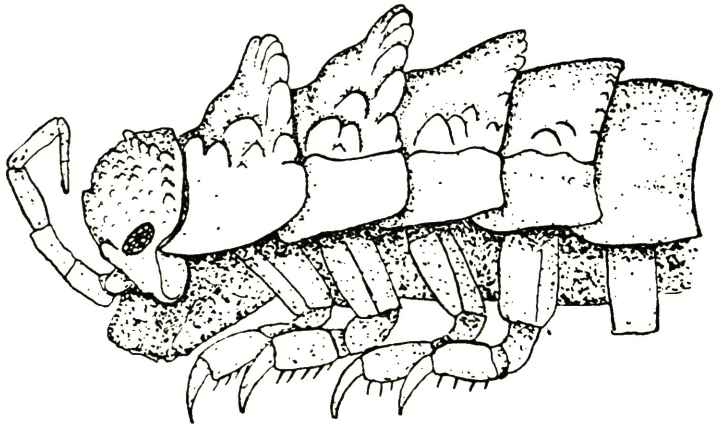
Colour—Light reddish brown, with small inconspicuous whitish marking legs and pleopoda white.

Length, 5-5 m.m. *Breadth*, 3 m.m.

Remarks—This species appears to be related to Budde Lund's sub-genus *Tura*, but differs in having 4 brushes on both mandibles and a distinct notch in the basal joint of the uropod. Verhoeff regards his sub-genus *Agabiformis* as including *Tura* and I am therefore placing this species with some hesitation in that sub-genus.

Hemilepistus pectinatus, B. L.
Budde Lund, 1885, p. 135.

Locality—Between Mosul and Korind 1921, Capt. H. E. Shortt, 12 ♀ 3 ♂ specimens.



Text Fig. 2.

This species is very like *H. Kulgii* (Brandt) and it seems probable that the male has been described as *H. Klugii* by Brandt, 1833, p. 179, and the female as *H. pectinatus* by Budde Lund. The *H. Klugii* material at my disposal has not however been sufficient for me to definitely establish the unity of the two species. As the female specimens from Mosul and Korind correspond with Budde Lund's description :—

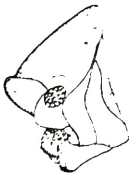
" Trunci epimera annulorum 2-3-4 sulco impresso a medio annuli discreta"—a feature of great interest and unknown in any other species of *Hemilepistus*,—there can be no doubt that they are the same species described by him as *H. pectinatus*, although there is no trace of such suture lines in the three male specimens and they appear to be identical with *H. Klugii*.

Leptotrichus politus, Sp.n. Plate VI.

Locality—Amara : Dec. 1918, Mr. R. G. Tame, 1 ♀ 7 ♂, specimens.

Description—Body oval, very convex, not more than twice as long as broad ; surface smooth and shining, with numerous small punctations and minute setæ which can only be observed with difficulty.

Head with lateral lobes small, rounded and sloping downwards, median lobes large, subtriangular, and smoothly rounded in the middle. Epistome bulbous, sloping smoothly downwards from the frontal lobe. Marginal line not very distinct, placed some small distance behind the margin of the median lobe, which has its edge rounded and continuous with the epistome. Just behind the marginal line is a shallow depression running across the



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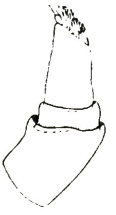

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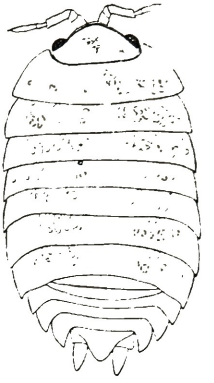

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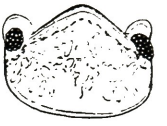

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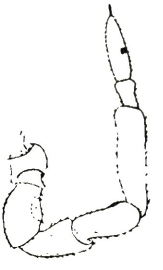

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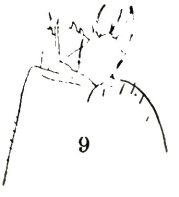

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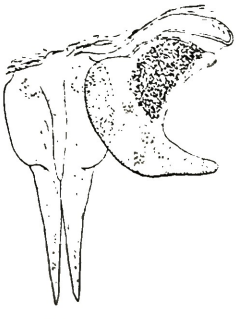

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13

Leptotrichus politus. sp. n.

THE TERRESTRIAL OSOPODA OF MESOPOTAMIA AND THE SURROUNDING DISTRICTS.

Explanation of Plate VI.

Leptotrichus politus, Sp. n.

1. Adult female.
2. Head of female from above.
3. ,, ,, ,, side view.
4. Antennule of female.
5. Antenna ,, ,,
6. Inner endite of maxillula of female.
7. Outer endite ,, ,, ,, ,,
8. Maxilla of female.
9. Maxillipede of female.
10. 1st peræopod of female.
11. 7th ,, ,, ,,
12. 1st pleopod of male.
13. Uropod of female.

head and to the back of the eyes, and marked off from the top of the head by an irregular broken line. Eyes with about 20 small ocelli.

Mesosome with coxal plates small and sloping downwards : 1st segment with the collar line single dorsally, the posterior margin without sinuosity and the hinder angles broadly rounded; 2nd with the posterior margin transverse, and the hinder angles a little rounded ; 3rd with a slight sinuosity and the angles sharper ; remaining segments showing progressively greater sinuosity and sharper angles.

Metasome with the pleural plates of the 3rd, 4th and 5th segments well developed and sub-triangular.

Telson triangular, with the sides slightly incurved and the apex rounded: dorsal surface not excavated, nearly or quite level.

Antennules, 1st and 3rd joints equal in length, 2nd about $\frac{1}{3}$rd the length of the 1st ; apex with about 16 " olfactory " setæ.

Antennæ short, reaching nearly to the posterior margin of the 1st segment of the mesosome ; 2nd, 3rd and 4th joints subequal, 2nd slightly the shortest, 5th a little shorter than the 3rd and 4th together. Flagellum biarticulate, 2nd joint a little more than twice as long as the 1st.

Mandibles : In the one female examined the right mandible was defective but had one brush on the setose pad, the left having 2 on the pad and 6 below. In one male the right had no brush on the pad and 4 below and the left 2 on the pad and 3 below, while in another the left had 2 on the pad and 4 below. The mandibles in this species would seem to vary not only with sex but in different individuals of the same age and sex.

Maxillulæ: Inner endite with small posterior spine and two short stout brushes of equal length. Outer endite with 4 major and 5 minor teeth, all sharp pointed and entire.

Maxillæ with the inner lobe wider than the outer, and without a basal lobe on the outer margin.

Maxillipedes with apex of the palp formed by a tuft of setæ ; middle region with 2 stout spines, each with 2 setæ at the base; basal joint with 2 spines; endite with one spine and three teeth, of which the innermost is very small.

Peræpooda stout and rather large, with numerous strong spines.

Pleopoda : 1st two pairs only with pseudotracheæ. 1st pair in the female well developed, more or less quadrangular, meeting at the median line. In the male the 1st pair have the exopodite crescentic in form.

Uropoda with the basal joint deeply notched externally ; endopodite projecting slightly beyond the telson ; exopodite short and stout, without bridge, and projecting about half its length beyond the apex of the telson.

Colour—Dark brown with scattered light yellow markings on the head and sides. Legs white.

Length, 8 m.m. *Breadth*, 4 m.m.

Porcellionides (=*Metaponorthus*) *litoralis*, (B. L.)

Budde Lund, 1885, p. 179.

Locality—Amara : 13th Feb. 1918, Capt. W. E. Evans, 9 specimens.

Porcellionides (=*Metaponorthus*) *swammerdami*, (Aud. and Savig.)

Audouin & Savigny: 1826, p. 289.

Localities—Amara: Capt. P. A. Buxton and Capt. W. E. Evans. Baghdad : Sept. 1917, Capt. P. A. Buxton, 2 specimens. Kizil Robat N. E. of Baghdad, Dec. 1918 Capt. W. E. Evans, 1 specimen.

This species was well represented in the collection. Most of the specimens were reddish yellow with darker markings on the margins but a few were lead grey.

Porcellionides (=*Metaponorthus*) *uniformis* (Koch.)

Koch, C. L., 1841.

Locality—Amara: 1918, Mr. R. G. Tame, 8 specimens.

I have accepted Budde Lund's identification of this species as Koch's description is insufficient and Budde Lund mentions in his M. S. that he has examined Koch's types. There is very little difference between this species and *P. pruinosus* (Brandt) and I feel doubtful whether they are distinct.

Porcellionides (=*Metaponorthus*) *pruinosus* (Brandt.)

Brandt, J. F., 1833, p. 19.

Locality.—Amara: Jan. 1918, Capt. P. A. Buxton, 2 damaged specimens.

I record this species with some hesitation as the condition of the specimens was very bad.

Philoscia elongata, Dollf.

Dollfus, Adrian, 1884.

Locality—Amara: Capts. C. L. Boulenger, W. E. Evans, P. A. Buxton and Mr. R. G. Tame.

I have been unable to consult Dollfus' original paper, but accept Budde Lund's statement in his M. S. that *P. pulchella*, Budde Lund (1885), is a synonym of *P. elongata*, Dollf.

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QL 334 .I8B6

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TITLE

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A survey